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SECOND SERIES.

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THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VI.—No. I.—JULY 1st, 1864.

THE CONDITIONS OF MEMBERSHIP.

Since the period at which the Pharmaceutical Society was rising to the position of an established institution, there has never, we believe, been a more general and anxious desire manifested for admission to membership than exists at the present time. The question—"What are the steps necessary for gaining admission to the Society?"—is so frequently addressed to the Secretary, that it has been thought desirable to give in this form the information which is asked for by many, and is no doubt wished for by a still greater number. The inquiries to which we refer, do not emanate alone from young men who are studying with a view to their establishment as Pharmaceutical Chemists, but also and especially from chemists and druggists already engaged in business on their own account. This affords satisfactory evidence of the soundness of the principles upon which the decisions and established regulations of the Society have been founded. The public discussion of questions relating to the constitution, the objects, and operations of our Institution appears to induce an increased desire to become connected with it, and the more firmly the application of a test of qualification is adhered to as a necessary condition to membership, the more is the attainment of the object desired, and the more when attained is it appreciated.

It is a natural tendency of the human mind to try to escape from a prescribed task which interferes with the voluntary excursions of thought, and involves a daily or habitual application of the mental energies in a specified direction. This prescribed work, although a wholesome discipline, essential to the proper training of the mind in youth, is always more or less irksome, and it becomes especially so to those who have passed from the age of pupilage and entered upon the duties and distracting occupations of manhood. Yet it is quite possible to give way to this feeling unduly, and no man will ever regret the result of efforts made to stimulate the mind to increased activity, especially when this is made the means of attaining to a higher social or professional position. The more severe may be the mental discipline imposed, the greater will be the satisfaction felt when the object sought for has been attained.

But we do not wish it to be thought that the ordeal imposed upon those who are seeking to enter the Pharmaceutical Society, is such as any man with moderate abilities and powers of application need fear to encounter. In an article following this the nature of an examination is described, and it will be found to be truly practical, and calculated fully and fairly to test the fitness of the candidate for the duties he proposes to undertake. No one, of course, would think of offering himself for examination without some previous preparation, and the only difficulty that can attend the undertaking is to know how to set about this preparation, and to find the time and application for its accomplishment. We propose on some future occasion to devote an article to the subject of preparation for the examinations. At present we have merely to point out what are the steps to be taken to become registered as Pharmaceutical Chemists, Assistants, and Apprentices, and for obtaining admission into the Pharmaceutical Society.

No person can be placed upon the Register or admitted into the Society without passing an examination.

Any person, after passing the required ordeal and receiving a certificate to that effect, is entitled, on payment of the specified fee, to be registered as Pharmaceutical Chemist, Assistant, or Apprentice, as the case may be. This gives him the title and privileges resulting from registration under the Pharmacy Act, but it does not make him in any way connected with the Pharmaceutical Society.

Those who have passed the examinations are *entitled* to registration, but they are only *eligible* for admission into the Society. Hence Registration follows as a necessary consequence of passing an examination, whereas admission into the Society, although founded upon the same qualification, is the result of a distinct application made afterwards, and it involves the payment of a separate subscription.

There appears to have been a good deal of misapprehension upon this subject, and it may be well therefore to endeavour to make it as clear as possible.

An apprentice proposes to be registered under the Pharmacy Act; he therefore presents himself for the classical examination, and on passing it, and paying a fee of two guineas, he is placed on the Register. If it be asked, what has he gained by this? it may be answered, that he has taken the first step, and paid the first instalment of the fee, for becoming a Pharmaceutical Chemist. But it may be asked, does he derive any immediate benefit, or anything in return for the payment of the fee? In reply to this it may be stated that he has the benefit of calling himself a Registered Apprentice, which implies that he possesses the first qualification for the higher position of assistant or pharmaceutist, but he has not yet entitled himself to anything more. If he desires at once to enjoy the advantages of association with the Pharmaceutical Society, he must apply to the Secretary for admission as a Registered Apprentice *of the Society*. This he will receive as a matter of course, on presenting his certificate, which implies the requisite qualification, but he will now have to pay a subscription of half-a-guinea a year to the Society. In return for this subscription he will receive the 'Pharmaceutical Journal' without payment, he will be admitted to the lectures provided by the Society on the payment of half the fees otherwise charged, he will have free admission to the Library and Museum of the Society, and be eligible to compete for the Bell Scholarships, besides enjoying other advantages conferred by the institution.

At the end of his apprenticeship, or earlier it may be, he desires to take the next step, and be registered as a qualified assistant. To enable him to do this he must pass the Minor Examination of the Pharmaceutical Society. In preparing himself for this examination some amount of systematic study is necessary, and if he has the means of doing so, he will no doubt avail himself of the instruction provided by the Society, and at the same time will reap the benefit of his connection with the Society. On passing the Minor Examination, and paying the fee (which, as he is a registered apprentice, will be three guineas, otherwise it would be five guineas), he receives a certificate of qualification as an assistant, and is registered as such. He has now taken the second step towards becoming a Pharmaceutical Chemist, but in doing this he has ceased to be a Registered Apprentice, having passed to a higher grade. His examination, however, has only entitled him to registration as in the former case, and if he wishes to belong to the Society, and continue to enjoy the resulting privileges, he must now apply to be admitted as an Associate. This would be granted, as a matter of course, on his presenting his certificate of qualification, and paying the annual subscription of half-a-guinea,—the same as he paid as a Registered Apprentice. Associates, as well as apprentices or students, enjoy the same privileges and benefits of the Society as members, excepting the right of being present at the general meetings of the Society, or of holding office, or voting in the Society.

The position and title acquired by passing the Minor Examination and being registered as a qualified assistant are held under the authority of the Pharmacy Act, and may be retained throughout the lifetime of the possessor. Not so, however, the position of Associate of the Pharmaceutical Society, for as the charter requires that associates shall be assistants to chemists and druggists, it follows that they must cease to be associates when they go into business on their own account. They must, then, become members or cease to belong to the Society. This, at least, is the present state of the law and regulations of the Society; but it will be recollected that, according to the proposed new Pharmacy Bill, the Minor Examination will afford a qualification for men in business as well as for assistants.

Following out the case of the individual whose course we have traced from the commencement of his apprenticeship, we may assume that he now desires to take the highest grade, by passing the Major Examination. On presenting himself for this examination, he must show that he is at least twenty-one years of age, but no other condition is imposed upon him. It is not necessary that he should have attended any lectures, or pursued any particular course of study; all that is required is that he should satisfy the examiners that he possesses the requisite amount of knowledge on the subjects on which he is examined. On passing the examination, he pays a fee, which, including what he has previously paid, amounts to ten guineas, and he is registered as a Pharmaceutical Chemist. He has now fulfilled all that the law requires. He may go into business, and call himself a pharmaceutical chemist. But here again, as before, the registration does not connect him with the Society, or make him a member. If he wishes to be a member of the Pharmaceutical Society, he must apply for admission, and pay the subscription of one guinea a year, or the life-member's commutation fee of twenty guineas. But there is yet another condition essential to membership, and that is, that he should either be or have been in business on his own account. He may pass the Major Examination before going, or even intending to go, into business. He may, therefore, be registered and have the title of pharmaceutical chemist while he is yet an assistant, but he cannot yet take up his membership in the Society; and if he desires to retain his connection with the Society, he must remain as an associate until he enters into business on his own account.

It will thus be seen that those who pass the examinations and are registered as pharmaceutical chemists, assistants, and apprentices under the Pharmacy Act, do not necessarily belong to the Pharmaceutical Society, although all who belong to the Society are necessarily registered, and none can now be registered without being examined. The register contains the names of all those who possess the qualifications required by law as specified in the Pharmacy Act. It comprises all the members, associates, and registered apprentices of the Pharmaceutical Society, but it also includes others who, having passed the examinations and thus become registered, have rested satisfied with these distinctions, and have not sought the more prominent position acquired by connection with the Society. The list which is published annually and is appended to the present number of this Journal, contains the names of the members, associates, and apprentices of the Society, but this list does not comprise all who are registered, and those, therefore, who do not belong to the Society, although registered, will not find their names in this list. Some of those who have stopped short at the point of registration have done so from ignorance rather than design, being under the impression that having passed the examinations of the Pharmaceutical Society, and paid the fees demanded on examination, they had thereby become entitled to all the privileges and benefits the Society affords to those who belong to it. A slight investigation of the circumstances of the case would show how unreasonable such an expectation would be, and how impossible would be its realization. The maintenance of an establishment in Bloomsbury Square with all the means provided there for promoting the cultivation of pharmaceutical science, and the extension of pharmaceutical knowledge, including the gratuitous circulation of a scientific journal, are undertakings which could only be accomplished by the combined efforts and special contributions of an extensive association like that of the Pharmaceutical Society.

THE MINOR EXAMINATION.

Whatever differences of opinion may exist upon other measures connected with Pharmacy, all seem to be agreed that an examination of some kind is absolutely necessary, both for the sake of the public and for the best interests of pharmaceutists themselves. The Minor Examination has been specially brought into notice of late, and as many persons may have imperfect or mistaken ideas of its character, an account of it is subjoined from the pen of an eye-witness.

"When a young man presented himself for the Minor Examination, the course adopted was as follows:—He first took his seat with the examiner in prescriptions, and a book was presented to him, full of those which had been actually made up at the counters of various dispensing chemists. They were not written to puzzle him, but were the actual prescriptions pasted into the book; those which he might have had to make up if in a situation, or such as he might be required to make up the next day. He was asked to translate them *in full* and at length, to give the *literal* English, and to give also that translation of the directions which he would write upon the label. He then passed to the dispensing-counter, when a prescription was handed to him, and he was required to make it up, sealing, finishing, and directing, as he would to a customer. His correctness and neatness and readiness in doing this were noted by the examiner, with the order in which he mixed the ingredients, and every other particular which marks a trustworthy and competent dispenser, and then he passed on to the Pharmacy table. Here he was shown the tinctures, powders, extracts, etc., of the Pharmacopœia, *unlabelled*, such as P. Rhei, P. Myrrhæ, Pil. Hydrarg., Pulv. Doveri, Ext. Hyoscy., Tinct. Opii, etc., and he was expected, by smell, taste, and appearance, to recognize them; he was questioned as to their composition, the manner of preparing them, the proportion of opium, mercury, or active ingredients in each, etc.; and then he took his place to be examined in Chemistry. Here he was shown the chemicals Hydrarg. Bichlorid., Alum, Potass. Iodid., etc., and questioned in the same way about them. He next presented himself at the Botany table. This was covered with fresh specimens of medicinal plants in flower, Conium, Hyoscyamus, Digitalis, etc., and he was expected to name them. Information as to the outlines of the science was sought, such as the difference between exogenous and endogenous plants, the names of the various parts, and the marks of some of the common classes. Then he went to the Materia Medica, where roots, leaves, gums, etc., were spread out before him, and he was expected to recognize them, and distinguish between different sorts,—Indian and Alexandrian senna, Turkey and Egyptian opium, good and bad Gum Arabic, etc., and to give some information about the countries and sources from whence they came. This was the plan for all; some began with one thing and some with another, but all went through exactly the same course. Each examiner gave a number to the candidate, according to his merit: 10 was the highest that could be attained; some candidates received 8 for one thing and 5 for another, and 7 for a third, and so forth; but when all were added up, the average must be 5, or the candidate was not passed."

Now, we are bold to ask, if this examination be not a good practical one, what examination can be so? Is not this knowledge that which is required to make a man a good sound pharmaceutist, such as the public may safely trust, and such as they have a right to seek? And is there anything in this which an apprentice of ordinary talents and diligence ought not to be able to pass with honour at the close of his apprenticeship? Of course the Major is more difficult, more scientific acquaintance with all these subjects is sought; but nothing then is required from a young man which a few months' study will not impart.

Amongst those who present themselves, chemists already in business are frequently found; and it is much to be desired that every facility should be offered to those who are desirous of doing this. There are two hindrances which naturally influence the man in business; he is unwilling to mingle with assistants and juniors, and to be examined with them. This has frequently engaged the attention of the Council, and there is no doubt that they would willingly arrange an examination, either in the evening or at any other suitable time, which should be for those in business only, if a sufficient number were to signify their readiness to avail themselves of it; and then it is, no doubt, felt by those in business, that their time for technical study has gone by, and that however qualified they may feel themselves for the practical conduct of their business, they might be rejected because of their want of scientific knowledge. To this it may be replied, that the ordering of the examination is with the Council, and that they have both the will and the power to vary it, according to the persons to be examined; that the knowledge required of men in business would be very different from that which would be sought from a young man fresh from his studies; and that the sound practical acquaintance with his business, which a respectable chemist possesses, would be sure to satisfy (in his case) the examiners appointed by the Council.

LEGISLATION AFFECTING TRADE.

The County Courts Acts Amendment Bill, which was introduced in the House of Lords by the Lord Chancellor, and which, although containing some useful provisions, would, if passed in its original form, have injuriously affected many tradesmen who have frequently to give long credit, was withdrawn on the 17th of June.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *June 1st*, 1864,

Present — Messrs. Bird, Bottle, Deane, George Edwards, Hanbury, Haselden, Herring, Hills, Morson, Orridge, Proctor, Sandford, Savage, Squire, Standring, and Waugh.

Being the first Meeting after the Anniversary, the following Officers of the Society were elected:—

George Webb Sandford .... *President.*
Thomas Hyde Hills .... *Vice-President.*
Daniel Bell Hanbury .... *Treasurer.*
Elias Bremridge.......................... *Secretary and Registrar.*

The usual Committees and the Boards of Examiners for England and Wales, and for Scotland were appointed. A Committee was also appointed to watch Parliamentary Proceedings.

Local Secretaries, on the Report of the Scrutineers, were appointed on the same principle as adopted last year,* and the List was ordered to be published in the ensuing number of the Journal and Transactions.

The following were elected—

MEMBERS.

Henry Archibald Hinton .. ..London.
Roger Hughes ....Denbigh.

John Hind Talbot, of Liverpool, having paid his arrears and his registration fee for the current year, was Restored to Membership.

Giovanni Battista B. Delviniotti, Professor of Physics and Chemistry, Corfu, was elected an Honorary and Corresponding Member.

The Secretary laid on the table a diploma granted by the Pharmaceutical Society of Victoria to the President, for the time being, of the Pharmaceutical Society of Great Britain, as "a mark of acknowledgment to the Council for its many obligations, and for its successful efforts in raising the science of Pharmacy." A letter, accompanying the diploma, from the Honorary Secretary, Mr. Joseph Bovisto, explained the several Australian Floras, of value in Pharmacy and in the arts, represented on the diploma.

BENEVOLENT FUND.

The following subscriptions to the Benevolent Fund were received during May :—

Allanson, Charles, Harrogate ...	£0	5	0
Appleton, John Cass, 45, Curzon Street	0	10	6
Bond, Charles, Kidderminster ...	0	5	0
Coupland, Joseph, Harrogate ...	0	10	6
Hurst, John, Louth	0	10	0
Randall and Son, Southampton	1	1	0
Rastrick, John Alfred, Woolwich	£0	5	0
Rogers, William, Maidstone	0	5	0
Rook, Edward, Sittingbourne ...	0	10	6
Sagar, Henry, Leeds	0	5	0
Stathers, John, Notting Hill ...	0	10	6
Vizer, Edwin B., 63, Lupus St., Pimlico	1	1	0

EXAMINATION, *May* 15*th*, 1864.

MAJOR (Registered as Pharmaceutical Chemists).

Chave, William Francis..................................Uxbridge.
Mills, John..Derby.
Phillips, Jonathan ....Godalming.
Squire, Alfred Rook ....London.

MINOR (Registered as Assistants).

Bennett, George..Chesterfield.
Goulden, Edward Baker ....London.

REGISTERED APPRENTICES.

NAME.	RESIDING WITH.	ADDRESS.
Bardsley, William	Mr. Nicholson	Highbury.
Garside, Thomas	Mr. Garside	Southport.
Havard, Benjamin	Mr. Jones	Cardigan.
Jeffery, George J. C.	Mr. Gulliver	Lutterworth.
Lewelyn, David	Mr. Jones	Cardigan.
Lewin, William J. C.	Mr. Lewin	Plymouth.
Sambrook, William	Mr. Jones	Cardigan.
Wilson, Thomas Davison	Messrs. Dobinson and Son	Sunderland.

* See vol. v. p. 5.

LECTURES ON THE BRITISH PHARMACOPŒIA.

ON THE RELATION OF THE BRITISH PHARMACOPŒIA TO PHARMACOLOGY.

Lecture II.

Delivered before the Members of the Pharmaceutical Society, April 20, 1864.

BY DR. JOHN ATTFIELD, F.C.S.,

DIRECTOR OF THE SOCIETY'S LABORATORIES.

(*Continued from Vol. V., p.* 636.)

Spiritus Ammoniæ Aromaticus.—Southall (Pharm. Journ. vol. xviii. p. 550) made exactly the suggestions which, carried out, would result in an aromatic spirit of ammonia, having all the improved characters of that now ordered. He suggested the use of ammonia itself, as well as carbonate of ammonia; the rejection of those aromatics that caused the spirit to become coloured when set by, and that it should be distilled; precisely the three improvements on the London, Edinburgh, and Dublin spirits that have now been introduced into the preparation by the authors of the British Pharmacopœia.

Spiritus.—Proctor's remark concerning the old London spirits (Pharm. Journ. 2nd ser. vol. i. p. 2), that being little used, they might very well be replaced by the stronger unofficinal essences, which were in far greater demand, seems to have been acted on. It is greatly to be regretted, however, that the name has not also been changed. The Dublin formulæ having been introduced into the British Pharmacopœia, why not have retained the Dublin name "essentia"? All three Pharmacopœias, however, had formulæ for spirits, and this is, possibly, the reason that the name "essence" was rejected; but the strength having been so greatly altered, the consequence will be that in neither kingdom will the word "spirit" mean what it used to mean, whereas the term "essence" would have caused no ambiguity.

Spiritus Chloroformi is now a five per cent. solution of chloroform in spirit. This strength was selected because the resulting liquid does not lose its chloroform even when diluted by water containing much saline matter (Garrod, Med. Times and Gaz. 1864, vol. i. p. 389). Before it was made officinal, this spirit, then erroneously termed chloric ether, was well known to vary in strength from five to twenty-five parts of chloroform in one hundred. Tate (Pharm. Journ. 2nd ser. vol. iii. p. 533) examined thirteen Liverpool samples, and found them to contain from ten to twenty per cent. of chloroform, indicating the importance of having its strength definitively and officially settled.

Succi.—Juices of medicinal plants were ordered in many of the Pharmacopœias of the last and early part of the present century. Those of hemlock, broom, and taraxacum are again introduced. A paper on these and several other expressed juices, the result of experiments commenced so early as the year 1835, by Squire, will be found in Pharm. Journ. vol. i. p. 94. He proposed them as substitutes for tinctures which are made from the *dried* parts of plants, thus obviating any deterioration from the exposure of leaves, etc., to the influences of heat, light, and air. The process for *Succus Taraxaci* is also that described by Hills (Pharm. Journ. 2nd ser. vol. i. p. 401).

Succus Limonis described in the Materia Medica as the expressed juice of the ripe lemon, may, according to Syme (Pharm. Journ. 2nd ser. vol. v. p. 161), be preserved unaltered for at least twelve months by simply heating to the boiling-point, and then, while still hot, bottling, corking, and securely sealing. He, in short, recommended Alsop's well-known method of preserving infusions (Pharm. Journ. vol. i. p. 58). If bottled during the winter, the juice need only be heated to 150°.

SUPPOSITORIÆ—The basis of the suppositories is white wax and lard. Tanner (Pharm. Journ. 2nd ser. vol. iv. p. 514) demonstrated the great superiority of cacao butter for these and similar preparations, and it is already extensively used for this purpose in other countries (Med. Times and Gaz., 1864, vol. i. p. 374). In the next edition of the Pharmacopœia the formulæ will possibly be altered.

SYRUPI.—*Syrupus Aurantii* is now made by mixing the tincture of orange peel with simple syrup, instead of dissolving sugar in an infusion of the peel, as directed in all the old Pharmacopœias. Savory (Pharm. Journ. vol. ii. p. 453) pointed out the troublesome character of the syrup prepared from the peel; and Southall (Pharm. Journ. 2nd ser. vol. i. p. 12) suggested spirit instead of water for extracting the orange peel, which was in effect recommending the tincture. The new syrup will be found to be much superior to the old.

Syrupus Ferri Iodidi. The strength of the new syrup is the same as that of the last three Pharmacopœias,—that is, about five grains of iodide of iron in one fluid drachm; but the proportion of sugar is much increased. Tichborne showed (Pharm. Journ. 2nd ser. vol. i. p. 170) that the weaker the syrup the more prone to decomposition, and suggested a preparation approaching perfect saturation with sugar. The present syrup is exactly such as recommended by Tichborne. Evaporation of water from it must be carefully guarded against, or some of the sugar will crystallize out. No process is given for estimating the amount of iodide of iron in the syrup, which, according to E. Smith (Pharm. Journ. 2nd ser. vol. i. p. 272), is liable to great variation. A volumetric method however, by T. and H. Smith, is given in the 'Pharmaceutical Journal,' 2nd ser. vol. i. p. 353.

Syrupus Ferri Phosphatis. The formula and process for the preparation of this syrup is almost word for word that of Gale, as described in the 'Pharmaceutical Journal,' 2nd ser. vol. i. p. 497: granulated instead of ordinary sulphate of iron being employed,—quite an unnecessary piece of refinement. This is the only syrup in which the product is said to "measure" instead of "weigh" a certain amount. Gale described his product by measure, and the authors of the Pharmacopœia have not, apparently, thought uniformity of expression sufficiently important to induce them to take the trouble of translating the description. Gale says that this syrup will be found to be definite in strength, permanently bright, and easily made. Each drachm contains about one grain of phosphate of iron, $3\,FeO, PO_5$, or rather more than one grain and a quarter of the hydrated blue phosphate of iron, $3\,FeO, PO_5 + 8\,HO$, with twenty-five minims of diluted phosphoric acid.

Syrupus Hemidesmi. This, in the Dublin formula, is made by dissolving sugar in an infusion of the hemidesmus. Bell recommended (Pharm. Journ. vol. iii. p. 240) percolation of the hemidesmus to avoid loss of the highly volatile flavouring principle, and suggested a syrup five times stronger than the one now introduced.

Syrupus Mori. The process for this syrup would be improved if the mulberry juice were heated to 212°, and strained *before* adding the sugar, as suggested by Southall (Pharm. Journ. 2nd ser. vol. i. p. 12). Heating *after* the sugar is added renders filtration difficult.

Syrupus Papaveris. The process by which syrup of poppies is now to be made is that of Groves (Pharm. Journ. vol. xiv. p. 203); it is an improvement on one previously suggested by T. and H. Smith (Pharm. Journ. vol. xii. p. 283), and its chief feature is that of the addition of spirit to a concentrated infusion of poppies, by which mucilaginous and fermentative matter is precipitated; the spirit being subsequently removed by distillation. Several pharmaceutists have proposed processes for making syrup of poppies, but the products have, sooner or later, been proved to be unsatisfactory. That now given is improvable, its author admitting it to be "somewhat troublesome."

Syrupus Sennæ also, though made by a new process, is stated by a writer in Edin. Med. Journ., Feb. 1864, to be, like Syrupus Papaveris, improvable.

Syrupus Tolutanus is still made from the balsam, and not from the tincture of tolu, as suggested by Finlay (Pharm. Journ. vol. ii. p. 138), and as it was directed to be in the Edinburgh Pharmacopœia. This is well, for Soubeiran once submitted to the Society of Pharmacy of Paris some specimens of syrup of tolu made with the tincture, but in comparison with others prepared directly from the balsam, they were pronounced to be decidedly inferior. Soubeiran also (Pharm. Journ. vol. i. p. 430), following out a suggestion previously made by Deville (*ibid.*, p. 290), that probably the same specimen of balsam might be used over and over again in the preparation of syrup of tolu, found that this might be done twice in the case of the formula of the French Codex, in which one part of balsam to four of water and eight of sugar were used, but that with half this quantity of balsam, that is, with one part of balsam to eight of water and sixteen of sugar, the balsam could not be used a second time. Now in the Pharmacopœia we are directed to use one part of balsam to thirteen of water and twenty-six of sugar; obviously, therefore, our balsam cannot possibly be used a second time. Savory subsequently (Pharm. Journ. vol. ii. p. 453) confirmed these results of Soubeiran. I refer to these investigations because some pharmaceutists are still of opinion that a diminution in the quantity of balsam can be admitted, which is much the same as using a larger quantity more than once.

Syrupus Zingiberis. Syrup of ginger is now made by mixing the tincture with syrup. The London and Edinburgh Colleges ordered that it be made directly from the rhizome. The last Dublin Pharmacopœia, however, directed it to be prepared from the tincture. Proctor and Southall also (Pharm. Journ. 2nd ser. vol. i. pp. 11 and 12) suggested this alteration.

Tincturæ.—The formulæ and processes for the preparation of tinctures have been so much altered, apparently without reference to any published investigations on the subject, that some experience is necessary before they can be critically examined in detail. Thirteen of the fifty-six are made by simply macerating the ingredients in the spirit for the uniform period of seven days,—a period which, even supposing the mixture has that occasional shaking which is *not* ordered, but which will of course be practised, may be unnecessarily long, or not long enough. I say that agitation will, as a matter of course, be practised, because experience has shown it to be necessary; at the same time, it is obvious that the authors of the Pharmacopœia have thought it to be unnecessary, inasmuch as in no one of these thirteen tinctures has this operation been prescribed, while in every other tincture occasional agitation has been expressly ordered. Of the remaining forty-three tinctures, four are simple solutions made in a few minutes. The rest, thirty-nine in number, are for forty-eight hours mere mixtures of ingredients and spirit macerating together, being shaken briskly now and then; the mixture is then transferred to a percolator, and when the fluid portion has drained from the ingredients, the latter is treated to a little more spirit, and finally pressed. This method of making these thirty-nine tinctures is certainly partly a process of maceration, which however may or not be complete. The latter half of the process may or may not be percolation, may or may not be mere filtration, may or may not be simple displacement. It may be percolation only, as in the case of a substance whose active principle not having been all dissolved during maceration, nor by subsequent rapid percolation, still yields something to the spirit which is finally put into the percolator; it is even easy to conceive a case in which active matter will after all remain in the marc, the latter part of the process would then be maceration and *partial* percolation. Or, the forty-eight hours' maceration having extracted the whole of the active matter from the ingredients, the other part of the process becomes one of mere filtration and subsequent displacement of adhering tincture by the spirit finally placed in the percolator. Thirdly, a substance having been partially exhausted of its valuable constituents by the forty-eight hours of maceration, and then placed in the percolator, the remainder of its active principles may be dissolved out by the percolation through it of the semi-formed tincture, the final addition of spirit displacing what tincture may be remaining adhering to the marc, subsequent pressure recovering some of the spirit so added. This last case is doubtless the model on which, theoretically, the processes for the thirty-nine tinctures are constructed. How far they actually conform to it can only be determined by experiment; and such experiments, though not by any means difficult to perform,—that is, so far as ascertaining the proportions of solid matter in a tincture at various stages of its manufacture is concerned,—have not yet, so far as I am aware, been conducted on any extensive scale. If one or several pharmacologists would take up this subject, the probable result would be the discovery of greatly improved processes for each tincture. Some would possibly be found to require only short maceration; others long maceration, shortened probably in most instances by subsequent percolation; and many perhaps be most advantageously prepared by percolation alone.

The only general series of experiments made with a view of improving the processes for the preparation of tinctures are those of Burton (Pharm. Journ. vol. v. p. 82). He examined the officinal tinctures of the London Pharmacopœia with the object of comparing the efficiency of the process of maceration, in which the ingredients after agitation subside to the bottom of the vessel, with that of maceration, in which the ingredients enclosed in a bag are suspended in the upper part of the menstruum. Burton's method of examination consisted, first, in taking the specific gravity of the tinctures, it being assumed that a process was complete when a tincture ceased to acquire weight by further contact with the solid materials. Specific gravity alone could not, however, always be depended on, chiefly on account of the variation in the amount of moisture in the ingredients; it was therefore considered together with the weight of hard extract obtained on evaporating a portion of the tincture in an oven, and exposing the residue to a temperature of 230°. In this way, operating upon different portions of one sample of a drug, Burton ascertained the most desirable period of maceration for each tincture. By the light of his researches we may be able, to some extent, to judge of the efficiency of the new process given in the British Pharmacopœia.

Tinctura Aloes. This tincture, which cannot be easily prepared by percolation, is to be made by maceration for seven days. Now Burton found (Pharm. Journ. vol. v. p. 123) that so far as the aloes is concerned, exhaustion was complete in forty-eight hours if the ingredients were suspended in the upper portion of the spirit, but that the extract of liquorice was not perfectly dissolved at the end of that time. Probably, therefore, the period of seven days might be much shortened, especially if the extract of liquorice were previously rubbed down with some of the water of the proof spirit.

Tinctura Assafœtidæ. In preparing this tincture, the Pharmacopœia orders maceration of assafœtida in rectified spirit for seven days. According to Burton, this period cannot be shortened.

Tinctura Calumbæ. The triple operation of maceration, percolation, and expression, ordered by the Pharmacopœia, is according to Burton's results unnecessary. By his method of macerating, less than forty-eight hours is sufficient to effectually exhaust calumba of everything soluble in proof spirit.

Tinctura Cascarillæ. Burton's results show that if cascarilla be suspended in proof spirit, two days' maceration is ample time for perfect exhaustion. The triple process of the Pharmacopœia is not therefore the best that could have been adopted.

Tinctura Cinchonæ Flavæ is probably one in which the forty-eight hours of maceration ordered, only partially exhausts the bark; the next operation in the percolator being true percolation, and the final addition of spirit to the marc an operation of displacement only, for the tincture made by Burton scarcely attained its maximum density in less than three days.

Tinctura Conii. When made by maceration of the *leaves* in proof spirit, Burton found tincture of hemlock to attain its maximum density in a day and a half. If the *fruits* yield their active matter with equal readiness, the Pharmacopœia triple process admits of improvement.

Tinctura Digitalis can be made by Burton's maceration in forty-eight hours. Here again, therefore, the process of the Pharmacopœia can be much simplified.

Tinctura Ferri Perchloridi. See *Liquor Ferri Perchloridi.*

Tinctura Hyoscyami will probably be found to be most advantageously prepared by the Pharmacopœia process.

Tinctura Jalapæ also, even when the jalap is suspended in the proof spirit, does not attain its maximum density till the third or fourth day of maceration (Burton), so that the triple process will probably expedite its preparation.

Tinctura Kino. The Pharmacopœia process for the preparation of this tincture consists in macerating the powdered kino in rectified spirit for seven days. The directions do not include occasional agitation, but shaken or not shaken, the kino adheres to the bottom of the vessel it may be placed in, and is only detached by violent rotation of the liquid. If, however, Burton's suggestion be adopted, namely, that of suspending the kino in a bag placed just below the surface of the spirit, exhaustion is perfectly effected in twenty-four hours, without any agitation whatever.

Tinctura Lavandulæ Composita is the only one of the fifty-six tinctures in which a quart instead of a pint is directed to be made in a single operation.

Tinctura Lobeliæ and *Tinctura Lobeliæ Ætherea.* Why is an ethereal as well as an alcoholic tincture of Lobelia included in the Pharmacopœia? They are identical in strength, and both ether and alcohol are efficient solvents of the active matter of Lobelia. (Bastick, Pharm. Journ. vol. x. p. 540.)

Tinctura Lupuli. Coates showed (Pharm. Journ. vol. vi. p. 428) that Burton's suggestion of enclosing the hops in a bag during maceration, greatly facilitated the preparation of the tincture, inasmuch as the hops could be pressed in the same bag. Burton found (Pharm. Journ. vol. v. p. 126) that the tincture when prepared in this way attained its maximum density in thirty hours; yet the authors of the British Pharmacopœia tell us to macerate for forty-eight hours, then to pack in a percolator,—an inconvenient operation, on account of the bulky character of the hop, and moreover quite unnecessary; next to displace adhering tincture by pouring into the percolator some fresh proof-spirit; and finally to subject the contents of the percolator to pressure. Obviously the first and last operations are alone necessary, namely, maceration and expression.

Tinctura Opii. This tincture is to be made by macerating opium in proof spirit for seven days. Nor can it apparently be made by maceration in a shorter time, for Burton states that it does not attain its maximum density till the end of a week. Many pharmaceutists, however, prepare it in a few hours by percolation.

Tinctura Quiniæ Composita. This is a solution of one hundred and sixty grains of sulphate of quinia in a pint of tincture of orange peel. Some pharmaceutists have complained that the whole of the quinia will not dissolve (Southall, Pharm. Journ. 2nd ser. vol. i. p. 12); but others have shown, however, that if the quinia be digested (temp. 90° to 100°) instead of merely macerated for seven days, complete solution is effected (Hemingway, Pharm. Journ. vol. xi. p. 68). Many again have stated that a deposit occurs in the tincture after some time, though this statement has also been contradicted. Mr. Hemingway now tells me that a precipitate may or may not be formed, when the tincture is set by, and that the cause is the variable nature of the peel used in making the tincture of orange. If peel sufficiently good cannot now be obtained, it may be found necessary, in a future edition of the Pharmacopœia, to include a small quantity of sulphuric acid in the formula for this tincture.

Tinctura Rhei. The formula for this tincture is new. It will replace the *Tinctura Rhei Composita* of the London and Dublin, and the *Tinctura Rhei* of the Edinburgh Pharmacopœias. I am told that, in this instance, the triple process ordered is a most excellent one. Liquorice is no longer a constituent of tincture of rhubarb, an omission suggested by Proctor (Pharm. Journ. 2nd ser. vol. i. p. 11).

Tincturæ Valerianæ. According to Burton, valerian is readily deprived of its soluble constituents by maceration in proof spirit for forty-eight hours. Subsequent percolation therefore, as directed in the Pharmacopœia, is unnecessary.

Tinctura Zingiberis. Tincture of ginger is now nearly twice the strength of the old London and Edinburgh preparations,—a change in accordance with a suggestion of Proctor (Pharm. Journ. 2nd ser. vol. i. p. 11), who urged as reasons for an increase in the strength, that the stronger tincture, called Essence of Ginger, was more in demand, and could be used for preparing Syrup of Ginger.

From these notices of about one-third of the whole number of tinctures contained in the British Pharmacopœia, it is obvious that the processes for their preparation are in only a few instances the best that could have been devised. The manufacture of tinctures is peculiarly the province of chemists and druggists,—a class whose confidence in the Pharmacopœia would have been greatly increased had the volume contained good evidence that the published researches of members of their own body and other gentlemen had had that attention they deserved.

The remaining two-thirds of the tinctures still need investigation, such as was brought to bear on them by Burton.

TROCHISCI.—Medicated lozenges were not mentioned in the London and Dublin Pharmacopœias. The Edinburgh Pharmacopœia contained formulæ for ten lozenges; three of these, namely, *Trochisci Morphiæ*, *Trochisci Morphiæ et Ipecacuanhæ*, and *Trochisci Opii*, have been retained in the British Pharmacopœia; and three new ones, namely, *Trochisci Acidi Tannici*, *Trochisci Bismuthi*, and *Trochisci Catechu*, introduced. Each tannin lozenge contains half a grain of tannic acid; each bismuth lozenge, two grains of white bismuth; each morphia lozenge, one thirty-sixth of a grain of hydrochlorate of morphia; each morphia and ipecacuan lozenge, one thirty-sixth of a grain of hydrochlorate of morphia and one-twelfth of a grain of ipecacuan; and each opium lozenge, one-tenth of a grain of *extract* of opium.

UNGUENTA.—Owing to the amalgamation of the old London cerates with the ointments, and the great discrepancies between several of the London, Edinburgh, and Dublin formulæ for the ointments, this class of preparations has undergone considerable change. So far as can be seen at present, most of these changes are improvements.

Unguentum Aconitiæ is now officinal. *Unguentum Atropiæ* is also new to the Pharmacopœia, but is not introduced to supersede *Unguentum Belladonnæ*, which is still retained, though the process of making it is slightly modified according to the suggestion of several pharmaceutists. *Unguentum Cantharidis* is apparently a compromise between the London *Ceratum Cantharidis*, the Edinburgh *Unguentum Infusi Cantharidis*, and the *Unguentum Cantharidis* of the three Pharmacopœias. *Unguentum Cetacei* is the London preparation with almond oil in the place of olive oil, as suggested by Deane and others

(Pharm. Journ. 2nd ser. vol. ii. p. 353). *Unguentum Creasoti* is of the Dublin strength, that is, twice as strong as the London, and three times the strength of the Edinburgh ointments.

Unguentum Hydrargyri. This is still made by rubbing metallic mercury with lard and suet. According to Tyson (Pharm. Journ. vol. i. p. 452), it is best made at once from black oxide of mercury, and he recommends a formula for its preparation in that manner. Donovan, Guibourt, and Watt (Pharm. Journ. vol. iii. p. 400) also believe the efficacy of mercurial ointment to be due to the black oxide of mercury always present in it. Finally, Von Bærensprung proved by many experiments (Journ. für Prakt. Chem. 1850, no. 9, and Pharm. Journ. vol. x. p. 554) that metallic mercury, either in the finely divided or gaseous state, is not capable of permeating dead or living animal membranes; that on triturating mercury with various substances a small quantity of black oxide of mercury is formed, and that this is the sole active constituent of blue ointment and several other preparations; that the action of blue ointment is uncertain, because the quantity of oxide contained in it varies according to its age and mode of preparation; and lastly, that a more uniform and effective preparation can be made from the pure protoxide. These conclusions of Von Bærensprung have never, to my knowledge, been questioned, and yet the old, irrational process of making the officinal mercurial ointment is still adhered to.

Unguentum Hydrargyri Nitratis. The mixture of solution of nitrate of mercury, oil, and melted lard, is now to be heated until the strong chemical action indicated by brisk effervescence has ceased. The resulting ointment will be an improvement on the old London form. The process is that of the London and Dublin Pharmacopœias, and is apparently that originally suggested by Duncan. Alsop, however (Pharm. Journ. vol. i. p. 100), came to the same conclusions after making many experiments. He at first proposed the use of almond oil in the place of the olive oil of the London formula, but on repeating his experiments before publishing a paper on the subject, he found that the superiority of the ointment he had obtained on using almond oil was due to the increased heat he had accidentally employed, and was independent of the variety of oil.

Unguentum Hydrargyri Oxidi Rubri. This ointment differs from the old varieties in containing almond oil. Possibly this alteration will afford a more permanent preparation. Keffer (Chem. News, vol. ii. p. 258) made the ointment with castor oil instead of lard, and at the end of two years found it to be without rancidity or loss of colour.

Unguentum Iodi Compositum. The iodine and iodide of potassium of this ointment are now directed to be mixed together by the help of a little proof spirit. Rectified spirit was formerly employed, but, according to Proctor (Pharm. Journ. 2nd ser. vol. i. p. 11), water is better than either.

VERATRIA.—The process for the preparation of this alkaloid appears to be good, but requires the use of a large amount of rectified spirit. Thompson suggested (Pharm. Journ. 2nd ser. vol. ii. p. 548) a modification of the process now adopted, which was far more economical.

VINA.—The wines, like the tinctures, are to be made in quantities of one pint. But as in the tinctures, so in the wines, there is one exception to this rule, that of *Vinum Aloes*, of which a quart is to be made at one operation.

Vinum Ferri was formerly made by digesting iron wire in sherry wine for a month, the metal being gradually dissolved by the agency of the acid salts naturally present. When made with wine of uniformly good quality, the preparation was a satisfactory one, but the amount of iron in it necessarily varied with the proportion of acid salts present in the sherry. An attempt has now been made to introduce a "steel wine" of constant strength, by dissolving eight grains of tartarated iron in every ounce of sherry. But a deposit soon occurs in the new preparation, and hence the formula is even more unsatisfactory than before. Proctor recommended (Pharm. Journ., 2nd ser. vol. i. p. 10) the employment of ammonio-tartrate or ammonio-citrate of iron, rather than the potassio-tartrate or tartarated iron now ordered; and Soubeiran (Pharm. Journ., vol. iii. p. 544) suggested the use of acid tartrate of the protoxide of iron, giving formulæ for the preparation of both the salt and the wine. Soubeiran's wine has the advantage of resembling the old preparation so far as containing a protosalt of iron, but it is more acid. Obviously a formula that shall give a wine of iron of constant strength and appearance, is still much needed. A well-known pharmacologist is, however, now working on the subject (Pharm. Journ., 2nd ser. vol. v. p. 492); we may therefore hope to have a more satisfactory preparation in a future edition of the Pharmacopœia.

Thus, gentlemen, have I endeavoured to bring before you the actual cases in which the authors of the British Pharmacopœia have taken advantage of the published researches, and adopted the suggested improvements of Pharmacologists. I also have not hesitated to point out the many instances in which this course has been neglected. We are told in the preface to the British Pharmacopœia, that in preparation of that work the General Medical Council of the United Kingdom found themselves committed to four difficult tasks, namely, "to supersede three Pharmacopœias, each of them long held in great repute,—to reconcile the varying usages, in pharmacy and prescriptions, of the people of three countries, hitherto in these respects separate and independent,—to consult the prepossessions of three important public professional bodies, which have ruled long and ably over this branch of medicine,—to represent accurately, yet with caution, the advancement made in chemistry and pharmacy during the thirteen years which have elapsed since the last edition of any of the Pharmacopœias of the Colleges of Physicians was published." To what extent the old Pharmacopœias have been superseded is not for the pharmaceutist to determine. He only knows that he must dispense what the physician prescribes, and he finds that so far from having to "alter or destroy all pharmaceutic preparations made according to previous, and now altered formulæ," (Preface, Brit. Pharm. p. xx.,) he will have to keep double stock for an indefinite period. Still less can he decide on the manner in which the authors of previous Pharmacopœias have been conciliated. But with regard to the removal of pharmacopœial discrepancies by blending the three books, and the extent to which the volume has been made the exponent of modern pharmacy, he can pronounce decided opinions. The fusion of the three Pharmacopœias into one is an object to which the attention of therapeutists and pharmaceutists has long been directed, and the necessity of which was forcibly demonstrated in a paper read before the Pharmaceutical Society by Squire, in the year 1845 (Pharm. Journ., vol. v. p. 200), and again in the volume with which that pharmacologist subsequently enriched the literature of pharmacy. The accomplishment of this object in the publication of the British Pharmacopœia cannot but command the congratulations of physician, pharmaceutist, and patient, and the manner in which discrepancies have been adjusted may be pronounced to be, on the whole, most satisfactory. But that the compilers of the Pharmacopœia have either accurately or cautiously represented the advancement made in pharmacy during the past thirteen years, is open to serious question. A review of the six lectures which have been delivered before you by request of your Council, and of the critical notices which have been published by the various medical, chemical, and pharmaceutical journals, must be quite sufficient to show that while the Materia Medica portion of the book is, on the whole, a success, that which relates to the preparations and compounds is to an equal extent a failure. Nor is this result astonishing when it is remembered that the British Pharmacopœia has for the most part been constructed by physicians, gentlemen whose post of duty is the bedside of the sick, not the pharmaceutical laboratory. The physician best knows what natural and artificial medicinal agents are admissible into the Materia Medica, but the pharmaceutist best knows how those materials are to be prepared and compounded. It is as irrational to delegate the compilation of a Pharmacopœia to one class only as to the other. It is true that the British Pharmacopœia contains better evidence of the labours of pharmaceutists than any previous Pharmacopœia, but had the work been thrown open to comment before, instead of after its publication, or the opinions of pharmaceutists been elicited in some other way, a work might have been produced which should bear favourable contrast with the Pharmacopœia of any other country, and have commanded the confidence of all interested in its pages.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE AMOUNT OF ALKALOIDS IN THE CINCHONA TREES CULTIVATED IN JAVA.

BY DR. J. E. DE VRY.

A. *Cinchona Calisaya.*

The materials of which the analytical results are contained in the annexed Table were the following:—

No. 1. A tree grown in the *open sunshine*, on a very bad volcanic subsoil, at Tjibodas, 4500 feet above the sea. The tree, which was six years old, had died from disease.

No. 2. A tree six years and a half old, grown in the same locality and under the same circumstances. Before its death it bore flowers and ripe fruits.

No. 3. A tree six years and a half old, transplanted four years ago from the above-mentioned locality to the dense shade of the forest on the slope of the mountain Gedé. Was nine feet high when it died.

No. 4. A tree seven years old, grown at Tjiniroean, 4820 feet above the sea, on the mountain Malabar, in the light shade of *Erythrina indica*. Died without known cause.

No. 5. A tree seven years old, grown and transplanted like No. 3. It had two stems, of which one died by disease and was cut off, whilst the remaining stem is still alive.

No. 6. A tree seven years and a quarter old, grown and transplanted like No. 3. Died from disease.

No. 7. A tree seven years old, grown in the *open sunshine*, in a very bad volcanic subsoil, at Tjibodas, 4500 feet above the sea. Died strongly infected by mycelium.

No. 8. A tree three years and a half old, grown from a cutting in the dense shade of the forest near Gedongbanteng, on the mountain Malabar, 5800 feet above the sea. Died infected by mycelium.

No. 9. A thick branch from the oldest tree in Java, imported from Paris in April, 1852. The tree growing at Tjibodas in the strawberry-garden of the Governor-General is now more than twenty feet high.

No. 10. A thick branch from a tree eighteen feet and a half high, growing in the dense shade of the forest on the slope of the mountain Gedé, 4700 feet above the sea.

No. 11. A tree seven years old, grown in the plantation Tjkoekoer, on the mountain Malabar, 5600 feet above the sea. Died from disease.

No. 12. The top of a tree growing in the plantation Kebon Pahud on the mountain Malabar, 5800 feet above the sea. The top had been broken off by the wind, but the tree is still alive.

No. 13. A tree grown in the plantation Kebon Pahud on the mountain Malabar, 5800 feet above the sea. The amount of the bark of the stem of this tree was only 22 grammes, and that of the bark of the root only 8 grammes, so that both were combined for chemical investigation.

No. 14. A tree grown in the same locality. The root was so small that it produced only 4 grammes of bark, which were not analysed.

B. *Cinchona lancifolia.*

No. 1. A tree four years old, grown in the plantation Gedongbadak on the mountain Malabar, 6200 feet above the sea, *almost without shade.*

C. *Cinchona pahudiana.*

No. 1. A tree seven years old, transplanted four years ago from the bad volcanic subsoil at Tjibodas, in the dense forest on the slope of the mountain Gedé, 4700 feet above the sea. Was sixteen feet high when it died.

No. 2. A very thin tree, seven years old, from the same locality. Although it was eighteen feet high, it produced only 148 grammes of dry bark.

No. 3. A tree seven years old, grown in the open sunshine in a bad volcanic subsoil at Tjibodas, 4500 feet above the sea. Was in perfect health, and had borne abundance of flowers and ripe fruits. The circumference of the stem at the base was 25·5 centimetres.

No. 4. A tree seven years and three-quarters old, grown and transplanted like No. 1. Its height was 356 centimetres, with a circumference at the base of 24·5 centimetres. Was in perfect health.

No. 5. A tree two years and a quarter old, grown at Tjiniroean, on the mountain Malabar, 4820 feet above the sea, in the shade of the forest, from Javanese seed. The fibrous root produced 46 grammes of dried bark.

No. 6. A tree five years old, grown in the plantation Gedongbadak, on the mountain Malabar, 6400 feet above the sea. It was 253 centimetres high, with a circumference at the base of 18 centimetres.

No. 7. Six trees, four years old. The tallest was 342 and the shortest 234 centimetres high. Only the roots of these very thin trees were analysed.

No. 8. One hundred young trees two years and a half old, grown in different localities on the mountain Malabar between 5000 and 6500 feet above the sea. These very healthy plants produced together 1670 grammes dry bark of the stem, 12966 grammes dry stemwood, 870 grammes dry bark of the roots, and 1911·54 grammes dry wood of the roots.

No. 9. Four thin trees four years old, grown in the plantation Gedongbadak, on the mountain Malabar, 6300 feet above the sea, from which the tallest was 530 and the shortest 153 centimetres high. The roots were so small that they produced together only 56 grammes of dry bark.

No. 10. A very healthy tree four years and a half old, grown in the plantation Gedongbadak, on the mountain Malabar, 6200 feet above the sea, in the forest, but almost *without shade.* It was 500 centimetres high, with a circumference at the base of 5·9 centimetres.

No. 11. A few hundred very young seedlings between six and eight inches long, which had died shortly after their being planted out in the forest. Their roots produced 100 grammes of dry bark.

No. 12. The top of a still living tree growing on the mountain Malabar, 5900 feet above the sea.

No. 13. A very healthy tree, five years old, grown in the plantation Gedongbadak, on the mountain Malabar, 6300 feet above the sea, in the forest, but

Material.	Alkaloids in 100 parts.	Quinine in 100 parts.	Quinidine in 100 parts.	Cinchonine in 100 parts.	Cinchonine and Cinchonidine in 100 parts.	Cinchonidine in 100 parts.	Quinovic Acid in 100 parts.
A. *Cinchona Calisaya.*							
1. a. Bark of the stem	1·750						
b. Bark of the root	0·820						
2. a. Bark of the stem	5·000	3·148	0·387	1·465			1·441
b. Bark of the root	1·323	0·655	0·241	0·427			0·765
c. Bark of the thick branches	2·600	1·184	0·436	0·980			0·640
3. Bark of the stem	1·040	*x*		*y*			0·620
4. Bark of the stem	0·648	*x*		*y*			0·386
5. Bark of the stem	2·941	1·685	0·868	0·388			
6. Bark of the stem	1·770	1·515		0·255			
7. a. Bark of the stem	3·443	0·444	2·834	0·165			0·036
b. Bark of the root	2·877	0·305	2·492	0·080			0·670
c. Bark of thick branches ...	1·046	0·420	0·550	0·076			0·195
8. Bark of the stem	0·200	*x*		*y*			0·325
9. Bark of a thick branch......	1·942	0·910	0·772	0·260			0·465
10. Bark of a thick branch......	1·416	1·070		0·346			0·210
11. a. Bark of the stem	1·190	0·125	0·441	0·624			0·155
b. Bark of the root	3·325	0·500	1·717	1·108			0·300
c. Bark of the branches ...	0·055	*x*		*y*			0·055
12. Bark of the stem	2·255	1·036	0·183	1·036			0·691
13. Mixed bark of the stem and root..........................	2·920	1·550	0·490	0·880			0·587
14. Bark of the stem	2·760	1·394	0·234	1·132			0·610
B. *Cinchona lancifolia.*							
1. a. Bark of the stem	4·130	2·300			1·830		trace
b. Bark of the root	2·910	1·900			1·010		0·180
c. Bark of the branches ...	0·180	*x*			*y*		trace
C. *Cinchona pahudiana.*							
1. Bark of the stem	0·165	*x*			*y*		
2. Bark of the stem	0·700	0·700					
3. a. Bark of the stem	0·500	*o*			0·500		0·050
b. Bark of the root	0 673	*x*			*y*		0·383
4. a. Bark of the stem	1·274	*o*			1·274		0·073
b. Bark of the root	2·818	1·849			0·969		0·312
5. a. Bark of the stem	0·090	*o*			0·090		0·200
b. Bark of the root	1·941	1.576			0·365		1·080
6. a. Bark of the stem	trace						0·190
b. Bark of the root	1·270	0·730			0·540		0·500
7. Bark of the root	0·948	*x*			*y*		0·465
8. a. Bark of the stem	*o*						0·095
b. Bark of the root	2·330	1·400			1·930		0·570
9. a. Bark of the stem	0·310	0·310					0·193
b. Bark of the root	0·900	0·900					0·560
10. a. Bark of the stem	0·469	0·385			0·084		0·067
b. Bark of the root	4·244	2·987			1·257		0·360
11. Bark of the root	0·785	0·785					0·377
12. Bark of the stem	0·110	0·110					trace
13. a. Bark of the stem	0·684	0·684					
b. Bark of the root	2·142	1·672			0·470		0·265
14. Bark of a branch	trace						0·180
15. Bark of a branch	0·584	0·214				0·370	0·064

almost without shade. It was 455 centimetres high, with a circumference at the base of 6·7 centimetres. It bore some fruit.

No. 14. A thick branch from a still living tree growing in the open sunshine on the bad volcanic subsoil at Tjibodas, 4500 feet above the sea. The largest circumference of this branch was 16·5 centimetres.

No. 15. A thick branch from a still living tree growing in the dense shade of the forest on the slope of the mountain Gedé, 4700 feet above the sea.

Although the discrepancy in the amount of alkaloids and quinovic acid is so great that it is quite impossible to derive any general conclusion, there are, nevertheless, a few facts which deserve special attention. The result of the investigation of the bark of *Cinchona Calisaya*, marked No. 2, proves that when the bark of a tree grown in such a bad soil contains such an amount of alkaloids, this species will produce the best results in Java if properly managed. The result of the investigation of the bark of *Cinchona lancifolia*, No. 1 *sub*. B, is equally satisfactory. It is true that the amount of alkaloids in the stem-bark of *Cinchona pahudiana* is much smaller than that in the bark of any other species in Dutch and British India which I have examined; but I consider it nevertheless large enough to allow the admission that the bark of this tree will prove to be not without some value. The large amount of alkaloids in the roots of this species shown by the results of the bark noted No. 10, *sub*. C, also deserves attention, and if compared with the results of the bark noted No. 11, *sub*. C, it proves that the roots of this species produce quinine even in the first stage of their existence. There are some who condemn *Cinchona pahudiana* because of the excessive thinness of its bark, which they consider too thin to be peeled. The exaggeration of this statement has been proved by Mr. M'Ivor, who presented me with perfect peeled bark of plants of this species only eleven months old. This gentleman, whose skilful management of the cinchona cultivation on the Neilgherries I have so much admired, gave me the following statement upon this subject:—"The Pahudiana, *when cultivated in the open sunshine*, yields a bark of average thickness; but *when grown under dense shade*, the bark is so thin that it cannot be removed from the stem." I conclude by quoting with great sympathy the following words of Mr. Clements R. Markham:*—"There is much to be learnt which practice only can teach; and it is surely better for us all to recognize this fact, and not to allow such difference of opinion as we may feel respecting a prospect as yet uncertain to interfere with courteous communication of sentiment, and co-operation as far as possible."

The Hague, April 22nd, 1864.

ON THE USE OF QUINOVIC ACID (*CINCHONA BITTER*) IN MEDICINE.

BY DR. J. E. DE VRY.

When I found, in 1859, that all parts of the different species of *Cinchona* growing in Java contained quinovic acid, of which I detected in the wood of the roots of *C. Calisaya* so much as 2·57 per cent., it appeared to me very probable that the tonic properties of some preparations of bark, particularly of an aqueous infusion, such as the *Infusum Corticis Peruviani cum Magnesiâ frigide paratum*, which formerly was frequently prescribed by many Dutch physicians, might be at least partially ascribed to quinovic acid. I therefore

* Pharm. Journal, April, 1863, p. 441.

employed the wood of several dead cinchona plants at my disposal for the preparation of this acid, which, by order of the Governor-General, was, at my request, experimentally tried by the medical staff of the Army. The official report on these experiments was so favourable, that the chief of the medical staff, Dr. Wassink, requested a further supply, in order to continue the experiments on a larger scale. As I had no more material at disposal with which to prepare quinovic acid, I wrote to my friend Mr. A. Delondre, at Havre de Grâce, who was kind enough to send me not less than five kilogrammes of the crude acid from his manufactory of quinine. Although my laboratory in Java was perfectly adapted for all kinds of chemical researches, the purification of such a quantity of a substance famous for its bulky volume gave me not a little trouble, but at length I succeeded in preparing two kilogrammes of quinovic acid sufficiently pure for medical use. This quantity was used by the medical staff of the Army for experiments on a larger scale in the hospitals of Java and Sumatra. The general report on these experiments, the result of which was very favourable, has been sent by the chief of the medical staff, Major-General Dr. G. Wassink, to the Governor-General of Dutch India, under date 5th March, 1863. It appears from this report that the quinovic acid has been used in the hospital of the west-coast of Sumatra in sixty-five cases of intermittent fever with or without complications, and in the great majority of cases with perfect success. In the hospital at Samarang, it has been used with the same success in forty-five cases, and it is with great satisfaction that I quote the following passage from the report respecting the experiments at Samarang:—

"The application of quinovic acid in diarrhœa and dysentery was made in consequence of the observation of its physiological action in diminishing the secretion of the intestines, which was attributed to a diminution of the peristaltic motion. In this aspect also the results were very satisfactory, and it is therefore a new property of the quinovic acid discovered, which agrees with the tonic properties which have been ascribed to it by Dr. de Vry."

It appears therefore not only that my suggestion about the tonic properties of the quinovic acid is well founded, but also that it is a remedy against intermittent fever. I therefore venture the suggestion to use the leaves of cinchona in British India against jungle-fever, which is in many districts a real plague. If the leaves are collected in the different cinchona plantations, which can be done without great cost, a tincture could be prepared from them with *proof spirit*, in which menstruum quinovic acid is easily dissolved, but not chlorophyll and some other inactive substances. I have much expectation that the proper use of such a tincture as a prophylactic would prevent many cases of jungle-fever in the localities where they are endemic. As the manufacturers of quinine throw away every year some hundred pounds of a substance containing quinovic acid, there is abundance of material for further experiments. I have found besides that the so-called *naucleic acid*, discovered by Mr. C. Bernelot Moens, military pharmaceutist at Batavia, in a species of *Nauclea*, is identical with quinovic acid; and as, according to my investigations, all the species of *Nauclea*, which are plentiful in the forest of Java, contain this acid in their bark, we have here another source whence an abundant supply could be obtained.

The Hague, April 23rd, 1864.

ON THE ROOT-BARK OF THE CHINCHONÆ.

BY J. E. HOWARD, F.L.S.

A letter from a gentleman owning a district in New Granada, containing trees of Chinchona, has been put into my hands by Mr. Markham. It shows very satisfactorily that the reprobation of the practice of extirpating these trees, which has found utterance in England, is beginning to produce a salutary effect in South America.

The letter is from Don Narciso Lorenzano, and is dated Bogotá, March 4th, 1864. He writes to his correspondent (— Griffiths, Esq.) as follows:—

"I have to thank you for having sent me a copy of the 'Edinburgh Review' of last year, in which I have had the satisfaction of reading the article on the cultivation of the *quina* trees in the East Indies. Permit me to congratulate you on the successful result of this undertaking, which partly ensures the supply of so precious a drug for the future. It appears to me that the principal motive which induced the government of India to commence this cultivation, after overcoming so many difficulties, was the fear that the *quina* trees would be extirpated, in consequence of the disorder and waste that is allowed in the woods, where they are destroyed by the barbarous method of pulling up the roots. Fortunately this destructive method, which, without any doubt, would extirpate this precious plant in a few years, is only practised in the forests of Pitayo, where it is due to the immoderate desire of making money which has taken possession of the Indians who own the greater part of the land. But in none of the other establishments for the collection of bark, in this country, has a similar scandal been repeated. On the contrary, beneficial rules are observed for the conservancy of the woods, more especially in those where I have a proprietary interest. The method consists in leaving a part of the trunk, about three feet in height, whence shoots may sprout, and in clearing away the surrounding trees to enable the rays of the sun to penetrate. By this means most of the trees that are cut down quickly shoot up, and the rays of the sun penetrating to the cleared ground, the seeds which fall from the tree germinate freely. Thus we have the satisfaction of seeing, in the forest worked on this principle, that the trunks of cut trees send out new shoots, and that the young plants grow vigorously. This result gives us full confidence that the good kinds of *quinas*, which exists in the country, will be permanently preserved.

"From the above considerations we may conclude that there need be no fear that humanity will see itself deprived of this precious medicine, seeing that as well in Bolivia as in Peru, Ecuador, and New Granada, the rule of cutting the bark according to a fixed plan is observed, and care is taken that the woods are replenished with increased numbers of plants of the best species, while some experiments have been made in forming plantations on land where the best conditions for their growth are found. From all this we hope that in a few years we may see magnificent results."

There can be but one opinion as to the inexpediency of continuing the "barbarous practice" referred to, whatever comes of the question as to the comparative produce of the root-bark. My observations apply to the root-bark of the Calisaya as found in commerce accompanying that of the trunk and branches. The low price which this brings, amid all the keen competition of the bark sales here, is sufficient evidence of its inferiority. I have just examined a favourable specimen, which is probably still unsold. This contains some better bark of the trunk mixed with a preponderance of that of the root. Separating this last, I found that it would be worth about half the price of flat Calisaya.

This question ought certainly to be set at rest, as it easily might be by the sacrifice of some half-dozen trees out of the million plants of the *Chinchona Pahudiana* which the Dutch possess in the island of Java. If, from the root-bark of these a competent proportion of commercial sulphate of quinine can be obtained to defray the expense of cultivation, then the important fact of their value will be established; but I believe this has not yet been done.

In time for the next number I hope to send a paper on the so-called "bark from the root of *C. lancifolia*" which is really a very interesting new variety of the *C. Pitayensis*—the *Pitaya roja* of commerce.

THE PHARMACOPŒIA PROCESS FOR CITRATE OF IRON AND QUININE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Having unsuccessfully tried to prepare some "Citrate of Iron and Quinine" according to the process described in the new British Pharmacopœia, and having, after repeated trials, come to the conclusion that the process was a fallacious one, allow me to ask you the favour of publishing in the next 'Pharmaceutical Journal' the following receipt of mine, which not only gives an elegant preparation, but also a product similar in every respect to that found in commerce.

I am, Sir, yours obediently,

Mauritius, May 6th, 1864. E. Fleurot, M.P.S.

Ferri et Quiniæ Citras.

Take six fluid ounces of a *saturated* solution of citrate of *peroxide* of iron,* made of such a strength that this quantity shall exactly represent six drachms of the anhydrous salt.

To such a solution, heated by the water-bath, add one drachm of citric acid previously dissolved in one ounce of distilled water, and immediately afterwards add at once the quantity of *quinia* freshly precipitated by solution of ammonia from two drachms of disulphate of quinia. Continue the application of heat, and stir the mixture constantly until all the quinia is dissolved. Solution of ammonia (P.L.) is then added drop by drop in sufficient quantity (about 2 fl. oz.) until the desired yellowish-green colour is obtained. The mixture must be stirred up briskly after the addition of each drop of ammonia.

Great care should be taken not to add an excess of solution of ammonia; the solution must, on the contrary, be slightly acid to litmus paper. The liquid is then left to evaporate on the water-bath until it acquires a syrupy consistence, when it is spread with a brush on glass plates, and placed in a stove to scale.

Note.—It sometimes happens that the solution of the salt in water has a milky appearance; this shows that there was not a sufficient quantity of citric acid in the preparation; it is obvious, then, to try a little of it previous to its concentration. For this purpose, take a small quantity of the liquid, dry it on a glass plate, and examine the salt as to its solubility and transparence. If, on dissolving the salt in water, the solution is not found to be quite clear, add to the preparation, while it is on the water-bath, a few grains of powdered citric acid, and repeat the process of drying, etc. etc., until you obtain a perfectly transparent solution.

TYSON'S PROCESS FOR BLUE PILL.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In reading over Dr. Attfield's lecture, contained in the last number of your Journal, I perceive that he quotes, approvingly, from Tyson, a process for

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* The saturated solution of *citrate of peroxide of iron* is made by saturating at the heat of the water-bath a solution of citric acid with freshly-prepared *hydrated sesquioxide of iron*, until no more oxide is dissolved in the solution of citric acid. The excess of oxide of iron is then removed by filtration, and the liquid evaporated to such a strength that every fluid ounce must represent one drachm of anhydrous citrate of iron.

making blue-pill, which I happen to know by experience to be a very dangerous one. After quoting Tyson to show that protoxide made a more certain (?) mercurial pill than the metal, he proceeds :—" Tyson made his protoxide (black oxide) of mercury from calomel, also by an ingenious modification of the usual method. He says, ' But the great secret that remains, is to procure the slate-coloured protoxide. Aqua Calcis will not do, as it produces an ash-colour from a mixture of muriate of lime ; Liquor Potassæ alone will not do, for it produces a brownish-black powder, containg a portion of submuriate of mercury undecomposed, and which no addition of Liq. Potassæ will act upon, but by the addition then of a small quantity of Liq. Ammoniæ (as well as Liq. Potassæ), the calomel is completely decomposed, and the slate-coloured protoxide immediately produced.' I have quoted these observations of Tyson," contines Dr. Attfield, " because I believe they contain the basis of a method of preparing a much better and more rational blue-pill than the officinal article ; I commend them to the notice of therapeutists."

Now, Sir, it is some five-and-thirty years since, when I was an apprentice, that I made a substitute for Hydrargyrum cum Creta by mixing the nearly black precipitate obtained by the action of ammonia on calomel with chalk; and what was the consequence? That I nearly poisoned some children in the neighbourhood. It purged and vomited violently.

The fact is, this black precipitate is not an oxide of mercury ; it is (as has since been shown by Sir Robert Kane) a chloro-amiduret of mercury, containing half the electro-negative elements that are in the officinal " white precipitate." I should not however have noticed the chemical error, only it might lead to dangerous practical consequences.

I am, Sir, yours respectfully,
John Aldridge, M.D.,
Pharmaceutical Referee to the Pharmacopœia Committee of the Medical Council.

Lower Sackville Street, Dublin, June 18, 1864.

[P.S. Perhaps I may be permitted to indorse Mr. Abbott's statements at the Leeds Association with respect to soap liniment, which I can thoroughly.]

ON THE CAUSES OF CHANGE IN SEED-OILS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In your last number, Mr. Whipple objects to some statements of mine contained in your Journal for April last, and inserted by way of appendix to my paper " On the Cohesion Figures of Liquids," contained in your number for March.

In using the terms " gum and mucilage," to account for the change that comes over certain seed-oils, I wished to explain that it is owing to the separation of some part of the matter of the seed with the oil, which by subsequent fermentation, or some similar change, induces or assists the acidification of a portion of the oil. The gum and the mucilage may not form the whole of the impurity, nor may they always be present ; but one, or both, is commonly present in the oil obtained from the seed-presses. Woody fibre and albumen occur more or less constantly. But woody fibre is less likely by its change to set up a putrefactive action than gum and mucilage ; the albumen would probably be separated more readily by settlement. A scientific friend connected with the oil trade, to whom I am indebted for some of the information in my paper, speaks of the " oil foots" as containing a considerable proportion of gum or mucilage. This refers more particularly to the olive-oil foots. Animal oils will, of course, contain a different series of impurities. My remarks referred chiefly to croton and castor-oils, both seed-oils, and it is possible they may contain less gum or mucilage than olive-oil, which is from the flesh of the fruit. But of the general fact there can, I think, be no doubt, viz. that if an oil be packed while containing impurities, such as gum, mucilage, albumen, etc., with water, these would be liable to putrefactive change, and would probably set up or increase acidification in the oil itself. My informant states, that when palm-oil is sent to this country dirty, it invariably contains a larger proportion of acid oil than that which is sent clean and fairly dry. He also adds, "that a considerable part of the foots of olive-oil is not soluble in alcohol, oil, or in turpentine, and has no property like spermaceti or adipocere. It is undoubtedly vegetable matter of some kind, and would repay examination."

I remain, etc.,

King's College, June 6, 1864. C. TOMLINSON.

THE LEECH-DESTROYER.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Dear Sir,—I hope to be excused for reverting to this subject. Since the publication of last month's Journal, I have received several letters from members and others, detailing their various experience: One gentleman suggests "the insect must be allied to the freshwater shrimps, of which he has hundreds in his leech aquarium; and they do not attack the leeches while living."

I merely recommend a reperusal of the account; it is the *living* leech that is punctured,—in fact, the voracious little parasite turned from a dead leech when placed beside it with apparent loathing, and would not again come in contact.

Another correspondent suggests that the insect is the larva of one of the water-beetles, probably the Nepa, known as the water-scorpion; and refers to Kirby and Spence as authority.

I have an impression that some years since the Journal contained a paper from the French "On the Enemies of the Leech,"* but not having all the back numbers bound, I am unable to ascertain if memory serves.

I have for four months past been trying an experiment, with a view to the perfect conservation of leeches, hitherto with complete success, and hope in due course to report thereon.

I remain, Sir, yours faithfully,

R. GOODWIN MUMBRAY.

PERCOLATION AND MACERATION.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I am not one of those who seem to take pleasure in finding fault with the British Pharmacopœia, apparently ignoring the difficulties with which its compilers had to contend. I see in it much to approve, and think it a step in the right direction; but having fairly tried it, the compromise between maceration and percolation does not, to me, appear to be a satisfactory process for making tincures. It has however suggested to my mind a modification of the old maceration process, which I have tried with satisfactory results.

I first procured a narrow-mouthed bottle holding exactly 80 fl. oz. to the neck. I then weighed the ingredients for a half-gallon compound tincture of

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* Vol. xii. p. 39, "On the Enemics of the Medicinal Leech," by Dr. Ebrard.—ED.

cardamoms, reduced the dry articles to a uniform coarse powder passed through a sieve of 20 meshes to the inch, put them into a 4-pint wide-mouthed bottle, then cut and added the raisins. I then put in 3 pints of proof spirit, macerated with occasional agitation for forty-eight hours, then with a covered funnel filtered into the 80 fl. oz. bottle as much as would drain off. I then pressed the marc and filtered the product. Having returned the marc to the wide-mouthed bottle, I added the fourth pint of proof spirit, again macerated for twenty-four hours, and pressed and filtered the product. I then added of proof spirit sufficient exactly to fill the 80 oz. bottle, which was 5 fl. oz. I have tried the same plan with compound tincture of senna, P.L., and with the same results, excepting that the waste was 6½ oz. instead of 5 oz. of spirit. By this plan the marc is practically exhausted, the process is easy, the result certain, the waste small, and the time occupied short, requiring perhaps to be extended a little in one or two instances, but not more. I have only a common screw-press, and my pupil has been the manipulator. Considering the difficulties attending the percolation process even under favourable circumstances, I am disposed to think the plan I have suggested will prove more eligible. If you think it worth while, you can publish this for the benefit of all whom it may concern.

I am, Sir, yours faithfully,

Bath, May 24, 1864. JOHN C. POOLEY.

P.S.—I trust that in the revised edition of the British Pharmacopœia there will be some more accurate adjustment of the title "compound," as it passes my skill to divine why tincture of senna *is not*, if tincture of cardamoms *is*, a compound.

LIQUOR FERRI PERCHLORIDI.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—That the process given in the Pharmacopœia for this preparation does *not* yield a product which will answer the tests there given for its purity, few who have tried it will, I think, deny, but, on the contrary, will agree with the remark made by Mr. E. Davies, in his lecture on "Iron," as reported in the last Journal, that "it gave a dark liquid containing protosalt and nitric acid."

After various experiments, I have found that if *twelve* instead of *ten* ounces of hydrochloric acid (sp. gr. 1·17) are used in the Pharmacopœia process, adding the additional two ounces after the iron is dissolved and the liquid filtered, then adding the nitric acid as directed, and evaporating to the bulk ordered, that a liquor is obtained which *will* answer the tests given, and on the addition of the requisite quantity of spirit, yield a tincture of elegant appearance, similar in colour and taste to the *Tinct. Ferri Sesquichlor. P.L.*

To those of your readers who possess Mr. S. Darby's translation of Wittstein's 'Practical Pharmaceutical Chemistry' I need say no more, they will find the decomposition clearly and fully explained there; and it may be sufficient to remind others, that *proto*chloride of iron requires *half as much more chlorine* as it already contains to convert it into *per*chloride.

I am, Sir, yours respectfully,

A. UTLEY.

4, *Mount Vernon Road, Liverpool, June 6th,* 1864.

PHARMACEUTICAL LEGISLATION.

BY MR. JOHN TUCK.

There seem to be at the present time many erroneous notions abroad as to the proposed Pharmacy Bill, and the influence it will have upon the various divisions of the labourers in the field of Pharmacy. Throwing all special pleading aside, and putting it in its simplest form, the present Bill proposes nothing more nor less than the following :—

1st. All the present chemists and druggists in business to be registered, and to have all of their existing rights and privileges, as before.

2nd. Members of the Pharmaceutical Society, and Pharmaceutical Chemists, to enjoy their chartered rights and privileges as at present.

3rd. Chemists and druggists' assistants actually employed as such before the passing of this Act, to be registered as Assistants under the Pharmacy Act, with power to commence business without examination.

4th. The Benevolent Fund is to be open to all, that is to say, past Members and Associates of the Society, Pharmaceutical Chemists, and registered chemists and druggists.

5th. After the first day of January, 1865, no person to commence business, unless he shall have received a certificate or certificates of qualification, from the Examiners of the Pharmaceutical Society, either as a chemist and druggist, or Pharmaceutical Chemist.

A more just and liberal measure to suit all parties could not I think be possibly devised; no reasonable man could desire anything more. The Pharmaceutical Society is the recognized head of the profession of Pharmacy in Great Britain, it obtained its Charter, its Act of Parliament, its exemption-from-jury privileges, and will without doubt obtain this proposed Act.

I look upon the measure as one that chemists and druggists of all grades, whether members of the Society from its foundation, Pharmaceutical Chemists by examination, or simply chemists and druggists, should strive hard to get passed into law; no stone should be left unturned, no means left untried to effect this desirable object, as it is for the common good of all. One great cause of the success of this measure will be, that there is no reasonable ground of opposition to it. It does not, like the proposed Medical Bill, inflict an injury, either directly or indirectly, upon any section of the trade, on the contrary, all existing rights are respected and guaranteed; hence all reasonable source of opposition (which by the bye would have strangled any measure in its birth) ceases to exist.

It has been supposed and stated by some that a formidable opposition would arise to it, on account of its not proposing to open the doors and admit the "outsiders" to the title and privileges enjoyed by its examined and other members, but this opposition, which is more imaginary than real, is so obviously unjust and unreasonable, that it may well be thought little of or cared little for; *I affirm that the Council dares not, even if it would, to so deliberately break faith with the Government, the Medical Profession, the public, and lastly and more important than all, the examined members. An opposition would then arise, and I for one should be glad to see it, such as never has been felt in* 17 *Bloomsbury Square before.*

The Society is composed of three different classes:—1. The founders, a body worthy of all respect and consideration as the pioneers of progress in Pharmacy in this country.

2. Those members admitted previous to the Pharmacy Act coming into force; and—

3. The examined Pharmaceutical Chemists, a body of men that stand high in the profession of Pharmacy, and who without any compulsion have nobly spent their time and money, studied their profession, and honourably taken its highest qualification.

Now I ask on what reasonable grounds can the "outsiders" who, to say the least of it, have done nothing for the Society, and oftentimes much against it,—on what grounds, I repeat, can they reasonably expect to be admitted to the title and privileges of the "insiders" in any one of the three sections before mentioned constituting the Pharmaceutical Society? The same means still exist for gaining admission as existed and still exist for Section 3 of the Society, and those means are examinations. Should the proposed Bill pass, the outsiders may join the Society and be registered as qualified chemists and druggists, with the title of Associate of the Pharmaceutical Society, and have the same privilege as members at any meeting of the Society, on passing the Minor examination only.

In conclusion, if we wish to raise Pharmacy to the position it occupies in other countries, if we wish to do away with a lifelong toil and little remuneration for the same, if we wish to benefit both the public and ourselves, we shall all, both members of the Society and non-members, unite for the common good, and directly and indirectly use our utmost exertions to get the proposed Pharmacy Bill passed into the law of the land.

Wilton, near Salisbury, June 21, 1864.

THE PROPOSED PHARMACY ACT.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I trust you will pardon my intruding upon your space; but having been prevented from attending the Annual Meeting last month, I have not had the opportunity of saying a few words upon the new Bill proposed to be taken into Parliament.

I have attentively read each clause, and, as a whole, consider it in every way answers the desired object without injuring the interest of any party; but while such is the case, one is somewhat surprised at finding the majority of the speakers at the meeting expressing great doubts whether we shall have power to pass the Bill through Parliament; and one main antagonistic cause evidently exists within our own family of chemists and druggists, consequently should be within our perfect control: and unless the difficulty be removed, I firmly believe our efforts will be abortive, and the expense thrown away; and we shall retire with no great dignity.

But why should this be? Can it be possible that after so many years' labour towards uniting the trade into one homogeneous body, and at the very time when unity of action is most absolutely necessary in order to obtain success, that for the sake of holding our own preconceived opinions we should wilfully fly in the face of reason? We all know that every man is biassed in favour of his own opinion, and that no dogmatic assertion that that opinion is based on wrong grounds will ever convince a man of his error; but let the parties meet, and calmly and logically enter into the disputed points, and error will speedily give place to sound reason. Now this is just the point with us at the present time.

The Pharmaceutical Society brings forward a Bill which, as I before said, I firmly believe in all its main points satisfactory; but there are other persons, not members of our Society, and these are not so satisfied, but feel themselves injured by certain clauses, and they therefore solicited an interview with our Council. Here was a step, I humbly conceive, in the right direction; and had our Council acceded to that request I can see no reason why difficulties should not have been removed; and in place of the present antagonistic feeling, which but too evidently exists, a mutual friendly action might have been brought to bear upon the desired object, and success in all probability have crowned our efforts; whereas, as matters stand at present, the two bodies are arrayed in deadly warfare, opposing and opposed.

Now, granting our Bill passed, let me ask what have we gained? Certainly no friends! not one who would put forth his hand and wish us God speed! but a host of unwilling and irritated brethren, kicking against the trammels of, to their way of thinking, an unjust law. Now we profess to be acting for the benefit of all parties, and yet only one side of the evidence is heard, and upon that evidence an opinion is passed and a Bill framed, without allowing one word of argument from the very persons whose interest, together with our own, we are supposed to have at heart. I must contend, Sir, that this is not a very reasonable mode of proceeding; neither can I understand upon what grounds the late Council could have refused to entertain the proposal to meet the officers of the United Society; the deed is done, but surely it cannot be too late even now to remove the evil.

The Session is now far advanced; business of importance probably coming before the House, a Bill brought in would stand a good chance of being hurriedly considered, and very possibly hastily rejected, when it is seen how largely divided in opinion are the very persons seeking legislative powers.

I do not wish to say a word against the gentlemen who held office; I feel satisfied too much praise cannot be given to them for the anxious care and thought bestowed upon their work, under the able guidance of our President, of whom we cannot speak too highly; but there is no denying the fact that a mistake has been made, and the question is how that mistake is to be remedied? In order to answer this query I think we need but to consider how the movement originated. The Council, at the request of members of the Society, called a General Meeting, at which it was considered advisable that a Bill should be prepared, and, if possible, passed in Parliament. The Bill has accordingly been prepared, and brought forward by the Council for the approval of the Society, and at the Annual Meeting accepted. Thus far all is well; another step is now required; let the newly elected Council, in their turn, call a general meeting of the *entire trade*, either at the Society's house or other convenient place; submit the Bill as approved, and then let the objections be fairly, calmly, and thoroughly considered. Such a meeting, if conducted in a liberal and friendly spirit, could not but be satisfactory to all parties; and would materially tend to remove the present ill-feeling which exists, and give power and effect to our cause before Parliament. Apologizing for the length of my letter, but feeling the urgency of the cause, I could not refrain from giving utterance to these few words; earnestly desiring to see animosity trodden down, and friendship established between brothers of our large and wide-spread family.

I am, Sir, faithfully yours,

EDWIN B. VIZER.

63, *Lupus Street, Belgravia South, June*, 1864.

THE PROPOSED PHARMACY ACT.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—Having been prevented by business from attending the Annual General Meeting, I have read with some interest the account of the proceedings and speeches made by various members on that occasion. As one of the members by examination, may I be allowed in a few words to express my opinion on the subject of this proposed new Pharmacy Act? There appears to me, throughout all the discussions, to be a most extraordinary solicitude on behalf of the "Examined Men,"—a fear, almost, that they should be brought to the level of those outsiders it is proposed to admit. As an examined member I must say (and I dare say I might do so for others) I feel exceedingly grateful for the great interest shown to preserve my position, but, as far as I know, I believe this feeling of jealousy (for it is nothing more) does not exist among the examined men themselves, and I believe it to be a great mistake. If this new Pharmacy Act is to come into operation and benefit us as a trade, it must be founded on the most liberal basis. We all know there are men outside the Society who are certainly on an equality, and some I have no doubt superior to many we call Pharmaceutical Chemists, both in scientific attainments and in sound practical business qualities, and these are the very men we want, men of experience and energy. Why, then, if they are to be admitted, should they not enjoy the same privileges, when they might bring their talents to bear, not more to their own advantage, than to that of the Society itself? I think it should be the object of the Council and of all who are interested in the welfare of the Society to strive to gain and bring into its membership those men who will conduce most to its well-working and prosperity. Of course under the proposed Act, many others must be admitted, but we need not trouble about them; our object should be to raise others as much as ourselves. And it must be remembered that most of these men have, although not connected with us, been contributing to the science and practice of Pharmacy and Chemistry. Here, then, is the opportunity for the Society to become firmly established; let not the Council cavil obstinately for a false superiority, but if the doors are to be opened let them be opened wide freely, let all in on the same footing with ourselves, and then see that they be well guarded for the future. How is it we see so little change in the Council? I should like to see a clause in the new Bill to this effect, that no member should remain more than two or three years in succession, it would bring more intelligence and energy to bear on its deliberations,—not but what we owe a good deal to the present members, but I think a little changing about would be beneficial. I sent a suggestion last year that the Pharmaceutical men should have a dinner, but I was sorry to find it met with *no* response. I still look forward to the time when we shall have our annual dinner, but at present I shall leave the matter to abler hands. At all events, it shows that "Pharmaceutical Chemists" are not such a hungry lot as the public take them for.

I remain, Gentlemen, yours faithfully,

FREDERICK TIBBS.

47, *Blackfriars Road*, *London*, *June* 21, 1864.

THE NEW ACT AS AFFECTING ASSISTANTS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—At the anniversary meeting of the Society, Mr. Edwards, in advocating the adoption of the Amended Pharmacy Act, submitted that he could not do better than allow the measure to speak for itself, and stand upon its own intrinsic merit; and seeing that the Society is now committed to carry the matter to Parliament, no assistance should be slighted or despised. It has occurred to me that were the proposed Bill, as affecting those Assistants now without the Society, fairly stated to them, it must gain from them a *large amount of vigorous moral support*, and, if I might instance the beneficial change the co-operation of young men in the early closing movement has produced throughout the kingdom, who could fathom the influence such moral support might wield? The moderation of the change sought, the undeniable desirability of the object, the spirit of justice to both sides breathed throughout the Bill, and the facility and inexpensiveness of its application to the whole trade, cannot fail in the minds of non-principal outsiders to overturn many a prejudice and refute a legion of old, and in some instances plausible, objections.

By way of illustration, take this one,—"Your examinations oblige us to incur outlay our position will not warrant, and they require too much time for general adoption by the profession." Now this one argument, to my own very limited knowledge, has debarred some score of young men with whom I have been brought into contact, and whose business abilities and manual industry were fully equal to the average, from presenting themselves for examination. It is useless to deny that success in business, rather than distinction in science, is the chief object most of us have in view; and that few, but those who have been fortunate enough to attend such lectures, and work in such laboratories as the Pharmaceutical Society provides, or have acquired the rudiments of their profession under superior and indulgent masters, pursue their studies with avidity, and attain eminence as scientific chemists. Separate this minority, and the remainder are lacking either the inclination or the means to qualify for any higher examination than the present, or perhaps a rather more stringent "Minor" one. The average number of working hours amongst chemists (taking town and country together) is thirteen per diem, and whatever character the individual business may possess, it is *not reasonable* to expect much systematic and zealous study in conjunction with such an undue tax on the faculties of both body and mind, especially when the subjects of such study are identical with those to which, by the requirements of business, the wearied soul has been confined all day long.

But to exact from Assistants such an amount of knowledge as the "Minor" requires, is only to ask for as much as few intelligent young men with a spark of interest in their labour, and with the very desultory reading obtainable in the routine of an ordinary pharmacy, could fail to acquire. Doubtless there are many honourable exceptions to such a type of Assistants both within and without the Society; but facts will, I think, bear me out in asserting that the majority answer to this description. To such, after passing the requisite ordeal and paying a very moderate fee, the Amended Pharmacy Act, *if passed*, would give a legal and sufficient recognition of competency, together with a share in the government of the Society, and permission (*itself a powerful stimulus to further exertion*) to take the higher degree whenever they become competent to do so. At the same time, and this is the noble aim of the proposed legislation, reasonable though not infallible safety would be secured to the community by preventing unskilful and ignorant men from compounding the præscripta of the faculty.

In conclusion, let me commend the serious consideration of the matter to the Assistants in our profession, and I feel firmly persuaded that the genuine "eloquence" of the measure alone will plead so effectually with them, that such a body of volunteers would arise to assist its progress into law as no amount of opposition could withstand, or successfully encounter.

Apologizing for the great liberty taken, and the amount of valuable space occupied,

I am, Sir, yours respectfully,

A MINOR ASSOCIATE.

THE LATE MR. BARRY.

It is probable that the subject of this notice was personally known to a very small proportion of our readers. Yet it is appropriate, and we trust it may be found instructive, here to sketch a few of the salient features and leading events of the character and life of a founder of the Pharmaceutical Society, whose labours have produced an indelible impression on the legislation of our country.

John Thomas Barry was the son of Alexander Barry, Esq., of Fratton, near Portsmouth. He was born in 1789, and was the eldest of a numerous family, several of whom were distinguished by conspicuous talents. His brother, Alexander, was a Hospital Lecturer at the age of twenty-one, and he was one of the youngest men ever elected into the Royal Society; but in 1832 his life of early promise was cut short by an accidental explosion occurring in the course of a scientific investigation. Another brother, Dr. Martin Barry, highly distinguished himself during a brief career. In 1834 he ascended Mont Blanc, and published an account of what was then a rare feat. He received the Gold Medal of the Royal Society, of which he also was a Fellow, for his physiological researches.

Mr. Barry himself early evinced unusual ability. Whilst still young he was deprived of both his parents. The direction of the education of the younger members of the family thus devolved upon him, and was carried out with characteristic assiduity and intelligence.

When about fifteen years of age he entered the establishment of Messrs. Allen and Howard, of Plough Court, Lombard Street. Here he soon displayed the sterling qualities of his character, and in a few years gained the entire confidence and firm friendship of Mr. Allen, to whom, indeed, he rendered himself almost indispensable. It was not long before he succeeded in reorganizing the old establishment, which even at that time had been carried on for three-quarters of a century, impressing upon it much of the systematic precision of arrangement which has ever since characterized it.

At this time Mr. Allen was lecturer at Guy's Hospital on Chemistry and Natural Philosophy; and Mr. Barry pursued certain branches of medical science in the same school, intending at this period to follow the medical profession, but the state of his health compelled him ultimately to relinquish the project. In anatomy he particularly distinguished himself. His talents were especially noticed by Sir Astley Cooper, who in subsequent years spoke very strongly of the brilliant success he might have commanded had he devoted himself to the practice of surgery.

About the year 1817 Mr. Barry applied the method of evaporating *in vacuo* to the production of pharmaceutical extracts. Under the celebrated patent of Mr. E. C. Howard, the principle was already applied in the refining of sugar. Mr. Barry invented a very ingenious apparatus for the purpose, which he patented, expecting it to be used in some important manufactures, but he declined to patent the *process* as applied to pharmaceutical purposes, thus leaving it open for the adoption of the trade.

The apparatus was peculiar, in not requiring the use of an air pump. It consisted essentially of a distillatory apparatus, *immersed in a water-bath* to prevent the ingress of air, with a large receiver attached at the end of the condenser. Into this receiver a pipe from a steam boiler opened, and streams of cold water could be made to play over its exterior. The vacuum was obtained by displacing the air from the receiver by a jet of steam, then condensing the steam, and repeating the process as often as required. Each "blowing" was calculated to remove four-fifths of the air from the apparatus, and thus, after a few repetitions, the mercury in the gauge would rise to within an inch and a half or two inches of the height of the barometer. Mr. Barry stated, that in actual practice the gauge commonly stood at 28 inches even during active ebullition, which was then kept up by a temperature of from 95° to 100° F.* This arrangement was efficient, and easily worked; but it has never come into general use. Perhaps the most interesting part of the apparatus, at the present day, is the *condenser*, which was arranged in every respect exactly as that which is now known as "Liebig's Condenser."

The importance of guarding against inaccuracy in making and errors in using poisonous articles deeply impressed Mr. Barry, and so early as about the year 1814 he introduced the plan of keeping the few poisons admitted upon the dispensing shelves in *angular* bottles, whilst all the more virulent poisons were kept altogether apart. His method of adjusting the strength of hydrocyanic acid was greatly in advance of the time, and especially elicited the approbation of his

* Med. Chir. Trans., 1st series, vol. x. pt. 1, 1819.

friend Dr. Wollaston. He was beautifully neat and exact in his chemical experiments, habitually operating on very small quantities of material; thus closely following Dr. Wollaston, who appears to have initiated this important improvement in the method of chemical research. Throughout life it was his practice to *try* a reaction for himself rather than to refer to a book. Thus his knowledge became remarkably sound; and he accepted the results of his experiments with unhesitating confidence.

His reliance on scientific principles was amusingly illustrated only a year or two since. One Sunday morning, volumes of smoke were noticed to issue from a cupboard in his dwelling-house. Remembering that he had put away there some signal-lights, he at once suspected spontaneous combustion, but instead of looking in and endeavouring to extinguish the fire with buckets of water, he closed the keyhole and pasted strips of paper along the crevices, and then, having thus blockaded the enemy, quietly sat down to read his Bible. All signs of activity within soon ceased; and when eventually the cupboard was examined the damage done was found to be very limited.

In 1838 Mr. Barry was elected as a foreign member by the College of Pharmacy of Philadelphia.

But whilst he was still in early life Mr. Barry's energies were devoted to an object of more general interest than the organization of a business, or the application of the sciences associated with it. His revered friend Mr. Allen was actively co-operating in almost every philanthropic undertaking of the day; and there can be no doubt that such an example had its natural influence upon Mr. Barry. We do not know the circumstances which gave the special direction to his labours. But it is not surprising that a sensitive and very thoughtful mind should have been roused to action in contemplating the horrible frequency of executions under the criminal law as it existed during the earlier part of this century. That this national disgrace has been so nearly removed is we believe more largely due to the labours of Mr. Barry than to those of any other individual. From natural temperament and from adopted principles he shrank from publicity, and never allowed himself to be made prominent in committees or societies. Self-reliant, and wonderfully energetic, he never sought to operate through organizations.

So early as the year 1808 a committee was formed which styled itself a "Society for Diffusing Information on the Subject of Punishment by Death." Among the leading members were William Allen, Luke Howard, Joseph Gurney Bevan, Richard Phillips, and Basil Montagu. They at once put themselves in communication with Sir Samuel Romilly, who was delighted to find himself thus supported in his humane endeavours to ameliorate the criminal code. Their meetings were held at Plough Court; but Mr. Barry, who at this date was only nineteen years of age, does not appear to have taken any prominent part in their proceedings for many years subsequently.

We cannot give a better idea of the part he eventually took in this great question than by extracting some portions of the notice of his labours which appeared in the 'Morning Star' of the 4th April. Alluding to the year 1828, when a new Anti-capital Punishment Society was formed, the writer says:—

> "Circumstances had drawn public attention to the cruel impolicy of retaining the capital laws against forgery; and to their repeal the Society at first appears to have more especially directed its attention. The gallows at this period flourished in great vigour, for, in 1829, no less than twenty-four persons were hanged in London alone, and amongst these there was not one murderer. In 1830, Sir Robert Peel brought in his Bill to consolidate the Acts relating to forgery. Sir James Macintosh moved an amendment on the third reading of the Bill, the effect of which was to abolish the capital punishment, except in so far as it related to the forging of wills and powers of attorney. At this critical moment Barry put forth all his marvellous

energies. Correspondence with the provinces had to be maintained, statistics prepared and arranged, members of Parliament to be addressed through their constituents, and every possible pressure brought to bear on the legislature in order to secure the success of the amendment. None but himself could ever really know the actual extent of the efforts by which Barry, almost single-handed, strove to accomplish his end. The philanthropist kept a list of friendly legislators who could be relied upon for 'franking' his voluminous correspondence, and estimated that his anti-forgery law agitation alone required 'franks' in lieu of postage to the value of one thousand pounds. The most remarkable evidence obtained by Barry of the growing opposition to the death-punishment was a petition from more than a thousand bankers presented by Brougham to the House of Commons on the 25th of May, 1830. To such testimony the legislature could not turn a deaf ear. Macintosh's amendment was carried against the Government by a majority of 13. The Lords, however, took alarm at this innovation, and re-enacted the capital penalty.

"In 1832, Sir Thomas Denman, then Attorney-General, brought in a measure totally to abolish death-punishment for forgery. Again Barry was at work with his correspondence, petitions, and statistics, and he had the satisfaction to see the Bill go up to the House of Peers. It was near the end of the session when the Lords took up the Bill. After much discussion it came back to the Commons altered by the re-enactment of the capital penalty for the forgery of wills and powers of attorney."

By a singularly sagacious use of circumstances, Mr. Barry obtained, as the Bill was passing through its last stage in the House of Commons, assurances from the minister which rendered the Lords' amendment inoperative, and no person after this ever suffered death for forgery.

"We must not omit to mention that at this stage of his career Mr. Barry was nobly supported by the eloquent pen of John Sydney Taylor in the columns of the 'Morning Herald.' A close intimacy existed between them. After Taylor's death, Barry edited a selection of his writings, and never ceased to the close of his own life to speak with affectionate admiration of the talents and generous nature of his departed friend. From the report of the committee, Barry's course for some years appears to have been marked by splendid triumphs. The year 1832 had witnessed, in addition to the passing of Denman's forgery Bill, the abolition of capital punishment for false coining, and also for horse stealing, sheep stealing, cattle stealing, and stealing in a dwelling-house, the last four measures being carried by Mr. William Ewart. In 1833, Mr. Barrett Lennard carried his proposition to exempt house-breaking (as distinguished from burglary) from the extreme penalty of the law. In 1834 and 1835, on the motion of Mr. Ewart, returning from transportation, stealing letters from the Post Office, and sacrilege were removed from the catalogue of offences punishable with death; and in the former year the disgraceful provision for 'hanging in chains' was erased from the statute book, attempts having been made to revive that odious practice at Leicester, and some other assize towns. In 1836, a Bill passed into a law, on the motion of Mr. Aglionby, for putting an end to the custom of executing within forty-eight hours after sentence all persons convicted of murder, —a custom which had occasionally cut off, with cruel precipitation, those whose innocence was discovered too late. In 1837, a large number of capital offences was at once swept away by Lord John Russell's Acts. They included 'cutting and maiming,' and rick-burning, for which the punishment of death was altogether abolished; and attempts to murder, robbery, burglary, and arson, where it was reserved only in cases of extreme aggravation. The importance of these Acts is best illustrated by the fact that the number of persons sentenced to death, which in 1837 amounted to 438, had fallen in 1839 to 56. In 1840, for the first time in the history of Parliament, a resolution for the total abolition of the punishment of death was moved by Mr. Ewart, and no fewer than ninety-four members voted in its favour. In 1845, the committee of the Society could congratulate itself upon the fact, mainly the result of its labours, that whereas in 1829, the year after its formation, twenty-four persons had been hung in London for offences other than murder, for twelve years preceding 1844 not one execution for any offence but murder had disgraced the metropolis. Those who had the pleasure in after years of hearing from Mr. Barry's lips the story of his life for the seventeen years covered by the above-mentioned report, could fill pages with stories of thrilling interest. He held that, with regard to a question on which public feeling must often prove fickle, and for which the masses of the people could hardly be expected to sustain any long-continued agitation, the course for him to adopt was to demonstrate by continued and persistent efforts the injustice, impolicy, and inconsistency of the law in dealing with individual offenders. By this means the administrators of the law became converted by circumstances rather than by argument from open opponents into allies or supporters. This line of action necessarily brought him into contact and sometimes collision with men in power, who exhibited not unfrequently the usual amount of official dislike to his humane interference. In after years, even when apparently exhausted by sickness, he would dwell with animation on some of these incidents of the past. He would tell how the first man convicted of murder, after the passing of Aglionby's Act, was proved (through the time allowed by that measure to elapse between sentence and execution) to have been totally innocent; or he would describe, with a keen sense of injustice and wrong, how, after long and weary journeys into the country, after tough wrestling with the Home Secretary of the day, or long midnight interviews with his friend Sydney Taylor, followed by an eloquent appeal for mercy from Taylor's pen, all proved in vain, and some unoffending victim of mistaken justice died to expiate another's crime.

"Mr. Barry took an active share, though in enfeebled health, in the operations of the Society for Promoting the Abolition of Capital Punishment, which took the place of its predecessor, the 'Society for Diffusing Information,' etc., and never denied himself, however severe his physical suffering, to those who sought his counsel in aid of the cause he had so much at heart."

When in 1841 the chemists and druggists determined to offer an organized opposition to the Medical Bill of Mr. Hawes, Mr. Barry cordially united and afforded them the valuable aid of his great experience in Parliamentary business. Thus he became one of the founders of the Pharmaceutical Society, and ever after evinced a sincere interest in its welfare.

About eight years ago Mr. Barry retired from business. He had never married, his health was frail, and as he frequently suffered from weakness or entire loss of voice he naturally shunned society and led a life of much seclusion. He continued to take an active part in circulating publications relating to the object upon which the best energies of his life had been expended, and his deep abhorrence of oppression and injustice caused him to regard with lively interest every great event affecting the welfare of mankind. To objects of which he approved he liberally contributed, but so thoroughly did he act in the spirit of the injunction "When thou doest alms let not thy left hand know what thy right hand doeth," that his name was scarcely ever seen on a subscription list, and his most intimate connections were, for the most part, unaware of his benevolent actions. In the same spirit he withheld his name from any public connection with the great labour of his life. It is scarcely to be found in the two volumes published under his superintendence by the committee of which he was the very soul; and in the memoir of Sydney Taylor above referred to, we have sought for his name in vain, although the work is preceded by a biographical sketch, written by himself, and abounds in editorial notes.

His personal appearance was striking. In figure he was tall and slim, his head was remarkably well developed and fine in form, his nose long and aquiline, and his features strongly expressive of the calm refined thoughtfulness of his mind. His general manner was remarkably gentle, affording no indication to the casual observer of the deep earnestness of purpose and stern energy of will which constituted the true basis of his character. It is not surprising that such a man inspired those immediately about him with respect amounting almost to awe. Yet blended with these indications of superiority and power there was ever noticeable a peculiar tenderness of feeling. No one, we think, can peruse the memoir of Taylor without perceiving the sympathetic pathos of the editor. It is evident that he accompanies with loving admiration the noble sentiments, generous impulses, and poetic tenderness of his departed friend. A remarkable power of accurate observation, combined with studious habits and a retentive memory, enabled him to accumulate from reading and travelling, in which he took great pleasure, a rich fund of general as well as scientific knowledge.

His last illness was marked by characteristic activity of mind, blended with the abounding consolations of a sincere Christian faith. Not long before the close, with animated emphasis he said, "Already I seem as if I were floating in clouds of everlasting light and glory; eye hath not seen, nor ear heard, nor hath it entered into the heart of man to conceive the things which *I now experience.*"

He died at his residence near Hornsey, on the 31st of March, and was buried at Winchmore Hill, in the ground belonging to the Society of Friends, to which body he united himself in early life.

MEMOIR OF LUKE HOWARD.

The decease of one of the oldest pharmaceutists in the country claims a few words of notice in our Journal.

Luke Howard died on the 21st of last March, in his 92nd year. It is interesting to look back to the changes which have taken place during his long life. In his earliest days, phlogiston reigned supreme in the realms of what was then scientific chemistry. The belief in the transmutation of metals still survived, and in the druggist's store *pulvis cranii humani*, *oleum lumbricorum*, and *oleum catulorum* still occupied a place. He was already a young man when Lavoisier revolutionized chemistry by the discovery of oxygen; when Priestley and Cavendish found out the joints of the armour of ignorance. He was in the full tide of the busy occupations of life when Davy riveted the attention of society at large by his magnificent discoveries; and was the intimate friend of Dalton. Iodine, the vegetable alkaloids, and a host of the other most valuable aids to medical skill, were totally unknown until long after.

It was about the year 1796 that he and the late Mr. Allen, taking the place of Mr. Gurney Bevan at Plough Court, first brought science—such as it then was—into connection with the preparation of medicines in England. Soon after this they jointly entered upon the foundation of a laboratory on a larger scale, and for the supply of the trade at large with pure preparations of the chemicals then in use. This was first at Plaistow. Mr. Howard afterwards, separating from Mr. Allen, removed it to Stratford, where it has been carried on up to the present time by his children and grandchildren.

Chemistry was not, however, Mr. Howard's most favourite science. In the year 1796, he, in conjunction with Mr. Allen and some few other scientific men, founded an association for the investigation of natural science, under the title of the Askesian Society. They got on the track of some of the most perplexed questions of modern science. Their first subject was, "Light: what becomes of it when it falls on a surface which does not reflect it?" Several of their papers were published, and were valued by the scientific men of the day.

Mr. Howard found in meteorology, then quite in its infancy, a subject of particular interest. He set up an observatory at Plaistow, and traced the connection of electricity and temperature with the different forms of the clouds. He soon found that the clouds admtited of classification, and his essay on the "Modifications of the Clouds" laid the foundation of all modern meteorological science. The names which he adopted for them, *cumulus*, *stratus*, etc., are well understood and exclusively used by all scientific writers throughout the world.

Nearly half a century ago, Mr. Howard withdrew from all active participation in commercial pursuits, and gradually also from scientific investigation, and devoted his time to various religious, philanthropic, and literary pursuits. He inherited a fortune which enabled him to do this without anxiety, and a happy Christian old age closed his peaceful career.

Amongst his published works are—'The Yorkshireman,' 'Notes on the Odyssey,' 'The Climate of London,' 'Notes on the Modifications of the Clouds,' 'The Barometrographia,' and 'Lectures on Meteorology.'

NOTE ON AN ALKALOID OBTAINED FROM THE SEEDS OF *RICINUS COMMUNIS*, OR CASTOR-OIL PLANT.

BY PROFESSOR TUSON.

It is well known that certain parts of several plants belonging to the Natural Order *Euphorbiaceæ*, as well as various pharmaceutical preparations obtained therefrom, have been long employed in medicine as remedial agents; and that, notwithstanding this circumstance, our knowledge respecting the chemical constitution and physiological action of the active principles residing in such bodies is even at the present day in an exceedingly unsatisfactory state.

For a considerable period I have devoted much of the time which I could snatch from that occupied in my regular professional pursuits to attempts at isolating the active constituents of the seeds and oils of castor and croton, of gum euphorbium, and of cascarilla bark, *i. e.* the bark of *Croton eleuteria* or of *Croton cascarilla*. Now although, as yet, I have not succeeded in accomplishing the particular object which I had in view when I commenced my experiments, I have nevertheless discovered several substances possessing chemical if not therapeutic interest, and it is one of these proximate principles which I have separated from the seeds and oil of *Ricinus communis* that I wish to partly describe in this communication. The compound to which I refer is an alkaloid, and I have provisionally named it ricinine.

Preparation of ricinine.—Crushed castor-oil seeds are exhausted by successive quantities of boiling water, and the matters soluble in water separated from the oil and other insoluble materials by filtration through wet calico. The filtered liquid thus obtained is then evaporated to dryness over a water-bath, and the extract produced is treated with boiling alcohol so long as it exerts any solvent power. The alcoholic solutions are allowed to cool, when a small amount of a resinoid body precipitates. This is separated by filtration, and the filtered liquid is concentrated to a small bulk and allowed to stand all night. The next morning a mass of almost white crystals are found to have deposited from the alcoholic solution. These crystals are the new alkaloid, *ricinine*. It may be obtained perfectly pure by recrystallization out of alcohol and decolorizing by animal charcoal.

Properties of ricinine.—Ricinine crystallizes in rectangular prisms and tables. When placed on the tongue, it slowly manifests a feebly bitter taste, resembling somewhat that of bitter almonds. Cautiously treated on a microscope slide, ricinine melts and forms a perfectly colourless and mobile fluid, which on cooling solidifies into a whorl of acicular crystals. Heated between two watch-glasses, a sublimate is obtained, which appears to be unaltered ricinine. Strongly heated on platinum foil, ricinine first melts and subsequently burns with a highly luminous and fuliginous flame.

The best solvents for ricinine are water and alcohol; benzol and ether dissolve but a small quantity of the alkaloid. Heated with solid hydrate of potash it evolves ammonia, thus demonstrating the presence of nitrogen.

Concentrated sulphuric acid dissolves the alkaloid without colouring it, and the addition of bichromate of potash simply causes the development of a green colour.

Iodic acid is not deoxidized by ricinine, even when these substances are warmed together.

Concentrated nitric acid dissolves ricinine without evolving red vapours, although heat be applied. On evaporating the solution thus produced to a small volume and allowing it to cool, groups of transparent and colourless acicular crystals develope. These crystals are rendered opaque by the addition of water.

Concentrated hydrochloric acid dissolves ricinine, but the hydrochlorate of the base, which is doubtless produced in this reaction, appears to be readily decomposed both by evaporation and dilution. A solution of ricinine in hydrochloric acid does not give a precipitate with a concentrated aqueous solution of bichloride of platinum, but on evaporating a mixture of these bodies well-defined octahedra and modifications of octahedra having a deep orange colour crystallize out.

On mixing together cold saturated aqueous solutions of ricinine and perchloride of mercury no change is at first observed, but if the mixture be allowed to stand for a few minutes a mass of beautiful silky crystals, arranged in radiate tufts, is formed; which is so solid that the vessel in which the experiment is performed may be inverted without any fear of its contents falling out. The mercurial compound of ricinine is soluble in water and in alcohol, menstrua from which it may be purified by crystallization.

If ordinary castor oil be shaken up with water, the water decanted and evaporated to dryness, a small quantity of resinous residue is left, which, when treated with boiling benzol, partly dissolves. If the benzolic solution of this residue be allowed to evaporate spontaneously, a small quantity of white crystals are obtained, which, so far as one can judge from their physical properties, are ricinine.

Neither ricinine nor the resinoid body which falls when the alcoholic solution of the aqueous extract of the seeds is allowed to cool, is the purgative principle of castor oil or of the seeds from which it is expressed, for I administered two grains of each of these educts to a rabbit more than a month ago, and the animal has not evinced the slightest inconvenience, temporary or otherwise. The true active principles of officinal Euphorbiaceæ I am still seeking, and the nature of the results which I have already obtained, induce me to indulge in the hope that before long I shall be enabled to publish an account of them. I may be permitted to conclude this imperfect account of ricinine by stating that I have obtained a similar if not identical body from croton seeds, and, so far as I have yet discovered, differing in several important characters from those described as belonging to cascarilline, an alkaloid discovered by Brandes in the bark of *Croton eleuteria* or *Croton cascarilla*, both plants belonging to the Natural Order Euphorbiaceæ.—*The Veterinarian.*

A BILL [AS AMENDED IN COMMITTEE] TO RENDER PERMISSIVE THE USE OF THE METRIC SYSTEM OF WEIGHTS AND MEASURES IN THIS COUNTRY.

Whereas for the Promotion and Extension of our internal as well as our foreign Trade, and for the Advancement of Science, it is expedient to legalize the Use of the Metric System of Weights and Measures: Be it enacted by the Queen's most Excellent Majesty, by and with the Advice and Consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the Authority of the same, as follows:

1. This Act may be cited as the "Metric Weights and Measures Act, 1864."

2. Notwithstanding anything contained in any Act of Parliament to the contrary, no Contract or Dealing shall be deemed to be invalid or open to Objection on the Ground that the Weights or Measures expressed or referred to in such Contract or Dealing are Weights or Measures of the Metric System.

3. The Table in the Schedule hereto annexed shall be deemed to set forth, in terms of the legal Weights and Measures in force in this Country, the Equivalents of the Weights and Measures therein expressed in Terms of the Metric System, and such Table may be lawfully used for computing, determining, and expressing, in legal Weights and Measures, Weights and Measures of the Metric System.

SCHEDULE to which this Act refers.

Schedule of Tables of the Values of the principal Denominations of Measures and Weights on the Metric System expressed by the Means of the legalized Denominations of Measures and Weights in Great Britain and Ireland.

MEASURES IN LENGTH.

Metric Denomination.		Equivalent in British Denominations.			
———	Metres.	Miles.	Yards.	Feet.	Inches Decimals.
Myriametre	10,000	6·	376·	0·	11·9
		or	10,936·	0·	11·9
Kilometre	1,000		1,093·	1·	10·79
Hectometre	100		109·	1·	1·079
Dekametre	10		10·	2·	9·7079
Metre	1		1·	0·	3·3708
Decimetre	$\frac{1}{10}$				3·9371
Centimetre	$\frac{1}{100}$				0·3937
Millimetre	$\frac{1}{1000}$				0·0394

MEASURES OF SURFACE.

Metric Denomination.		Equivalent in British Denominations.		
———	Square Metres.	Acres.	Square Yards.	Decimals.
Hectare	10,000	2·	2280·	3326
		or	11,960·	3326
Dekare	1,000		1,196·	0333
Are	100		119·	6033
Centiare	1		1·	1960

MEASURES OF CAPACITY.

Metric Denomination.		Equivalent in British Denominations.					
———	Cubic Metres.	Qtrs.	Bshls.	Pks.	Galls.	Qts.	Pts. Decimals.
Kilolitre	1	3·	3·	2·	0·	0·	0·77
Hectolitre	$\frac{1}{10}$		2·	3·	0·	0·	0·077
Dekalitre	$\frac{1}{100}$			1·	0·	0·	1·6077
Litre	$\frac{1}{1000}$						1·76077
Decilitre	$\frac{1}{10000}$						0·176077
Centilitre	$\frac{1}{100000}$						0·0176077

WEIGHTS.

Metric Denomination.		Equivalent in British Denominations.				
———	Grams.	Cwts.	Stones.	Pounds.	Ounces.	Drams. Decimals.
Millier . . .	1,000,000	19·	5·	6·	9·	15·04
Quintal . . .	100,000	1·	7·	10·	7·	6·304
Myriagram . .	10,000		1·	8·	0·	11·8304
Kilogram . .	1,000			2·	3·	4·3830
		(or 15432·3488 grains)				
Hectogram . .	100				3·	8·4383
Dekagram . .	10					5·6438
Gram	1					0·56438
Decigram . . .	$\frac{1}{10}$					0·056438
Centigram . .	$\frac{1}{100}$					0·0056438
Milligram . .	$\frac{1}{1000}$					0·00056438

MISCELLANEA.

Poisoning by Digitaline.—A very remarkable trial has lately taken place at Paris, in which a homœopathic physician, named La Pommerais, was charged with having poisoned a poor widow named Pauw, whom he had known for many years, and had attended her husband before his death, after which she became his mistress; and this connection continued till 1861, when it was broken off in consequence of Pommerais marrying a Madlle. Dubizy. The intimacy was renewed in July last, when he suggested that she should insure her life for £22,000, and that after payment of the first premiums she should simulate illness, and then make a proposal to the insurance companies that her policies should be exchanged for a life annuity. The policies were effected in July for the above amount, at annual premiums of £750, and on the morning of the 17th of November the widow Pauw was found in great agony, and died in the evening. Dr. Gaudenat, who had been in attendance, certified that death was caused by a fall three months previously. Pommerais afterwards applied to the companies for payment of the money due upon the policies; but suspicions having arisen, a *post-mortem* examination was ordered, and hence the present trial. The *post-mortem* examination was made by MM. Tardieu and Roussin. No poison was discovered in the viscera, but there was an absence of disease in the internal organs. However, from the symptoms exhibited before death, and from experiments made on animals with the vomited matters scraped from the floor of the room occupied by the deceased, and with the contents of the stomach, they were of opinion that death had resulted from some powerful poison, probably digitaline. On the other side it was contended that the experiments made with the matter scraped from the floor of the room were valueless, as it was impossible to say that organic matter in a state of decomposition might not have been sufficiently poisonous to cause the effects described. MM. Claude Bernard, Valpian, and Raynal were examined as to the action of digitaline on the heart, and described the experiments they had made with that substance. The jury found the prisoner guilty of poisoning the widow De Pauw. No mention of extenuating circumstances having been made, La Pommerais was condemned to death, and has since suffered the penalty.

Poisoning by Ranunculus acris.—An inquest was recently held at the Bull Hotel, Dartford, before Mr. C. J. Carttar, coroner, on the body of a child named Sarah Elizabeth Heron, aged six years. It appeared by the evidence of the mother and father of the child, that some time before death the deceased had complained of feeling very unwell, and in great pain about the body and legs. The mother afterwards discovered that the deceased had been eating buttercups from a field close by, and sent for a powder from a chemist's; but as the deceased vomited a great deal, and presented every appearance of having been poisoned, the parish surgeon (Mr. Martin) was sent for, but that gentleman did not arrive at the house till the child was dead. A *post-mortem* examination had been made, which proved the deceased had been poisoned by eating buttercups; and the jury returned a verdict to that effect.

Suicide by Aconite.—An inquest has been held at Bolton on the body of Hannah Hulme, aged 25, a domestic servant, who died from the effects of aconite. It was proved in evidence that she had been visited for the last eight months by a married man, who had represented himself as single. On finding that she had been deceived, and that she was pregnant, she drank a quantity of strong infusion of aconite, the remaining portion of which was found in a pint jug under the bed on which she was found dead. The jury found that "The deceased destroyed herself by drinking an infusion of aconite whilst in a state of unsound mind." The man was severely reprimanded for his heartless conduct.

Tincture of Aloes as an Application to Wounds.—M. Delioux observes that, notwithstanding the great repute of aloes as an external application in former times, it is now seldom used, and that he was induced to give it a trial in consequence of its great utility in veterinary practice. After trying it in combination with other balsamic substances, he has come to use it alone, finding a saturated tincture made with one part of aloes and two of alcohol to be the best preparation. Suppurating wounds, when at all of an atonic character, are to be dressed by means of charpie dipped in the tincture, the application causing little or no pain. Old and obstinate ulcers, and ulcers from decubitus in cachectic subjects are much benefited by it. It is useful also to bear in mind its great cicatrizing power in wounds and ulcers occurring in our domestic animals, especially the horse. Erosures and gallings by its aid are prevented degenerating into ulcers.—*Bull. de Thérap.*, vol. lxvi. p. 28.

Alleged Death from Chlorodyne.—At an inquest held at Shipton Sollars, Gloucestershire, before J. Lovegrove, Esq., coroner, on the body of an old woman who had taken ten drops of "Dr. Collis Browne's Chlorodyne," and who was found dead a few hours afterwards, Mr. A. W. Gabb, surgeon, who was acquainted with the deceased and had prescribed for her, made the following statement:—He knew the history of the case, and was well acquainted with "Dr. Collis Browne's Chlorodyne." He had not used it now for some time, because its effects on different constitutions appeared so uncertain. He had known fifteen drops to prove almost fatal. He did not know the composition of the medicine, but chloroform formed a prominent ingredient. Such a medicine ought not to be sold indiscriminately—except under medical advice. Being a sticky medicine it was difficult to drop, and he invariably used a minim glass for the purpose. He had given twenty-five drops in a dose, but that was by gradually increasing it. The cause of death in this case was the chlorodyne deceased took.—A verdict in accordance was returned.

Practical Application of Dialysis.—As a note to his paper on the "Utilization of Brine,"* Mr. Whitelaw has published the following in the 'Chemical News,' May 28:—The salt meat is placed in a dialytic bag made of untanned skin, or other suitable material, and the bag filled nearly, but not quite, full of brine from the beef barrel. The dialyser is then placed in sea-water, and the process allowed to go on for several days, till the meat and brine are sufficiently fresh for use, or till the brine in the dialytic bag is within 1° or 2° of Twaddell's hydrometer of the same strength as sea-water. In this way, as the brine becomes freed from salt, the beef, which, by the action of salt, has been contracted, gives its salt to the brine in the bag; and so the process goes on, the beef expanding like a sponge, and gradually taking up a great part of the natural juice that it had previously lost in the salting process. In this way no loss of juice is sustained by steeping, and the brine left in the bags, after a nightly dialysis in fresh water, can be used for soup. Thoroughly salted beef, without bone, takes up nearly one-third its weight of juice, and this absorption takes place gradually as the strength of the brine in the dialyser becomes reduced. Meat thus treated—being, in fact, fresh meat—may be cooked in a variety of ways that are obviously not available for salt meat; and so the food of sailors, and consequently their health, may be improved.

Preservation of Chloroform.—It requires but a short time for chloroform which is exposed to the sun's rays to undergo decomposition, hydrochloric acid being developed, and a strong odour of chlorine being present. This is prevented if the chloroform is kept in the dark; and when it has undergone decomposition by exposure, M. Boettger finds that it may be easily purified by shaking it up with a few fragments of caustic soda. As long, indeed, as it is in contact with the caustic soda it may be preserved for an indefinite period in diffused light.—*Bull. de Thérap.*, May 15.

REVIEWS.

The Essentials of Materia Medica and Therapeutics. By Alfred Baring Garrod, M.D., F.R.S.; Fellow of the Royal College of Physicians; Professor of Materia Medica and Therapeutics in King's College, London; Physician to King's College Hospital; and Examiner in Materia Medica in the University of London. Second Edition, revised and much enlarged. London: Walton and Maberly. 1864.

The appearance of a second edition of Dr. Garrod's well-known and appreciated text-book is a great boon to students at the present time, when such a work is in much request. The fact of a large issue of the first edition having been sold is, in itself, evidence that a volume of this kind was required, and that the want was supplied in a satisfactory manner. The object and general nature of the work will be best judged of by the following extracts from the Preface:—

"The present work is intended to serve as a text-book of Materia Medica, and while it is hoped that it omits nothing essential to the study of the science, it excludes such details as are often embarrassing to the student and seldom necessary to the practitioner.

* Vol. v. 2nd ser. p. 516.

It has been his object, while limiting its size, to include all points connected with the officinal preparation of medicines, and so much information on the therapeutic action of drugs as would serve as a sufficient guide in actual practice. All controversial points have been avoided, as unsuited to the design of the work; and the information confined to the facts really ascertained as to the action of each drug, and the purposes for which it has been advantageously employed."

"A Table of Contents, by a glance at which the reader will at once see all drugs scientifically arranged, together with their pharmaceutical preparations, is contained in the present edition; as likewise a Table indicating the principal changes of nomenclature and important differences of strength between preparations in the British Pharmacopœia and in the London Pharmacopœia, 1851; and lastly, a somewhat copious Posological Table is now introduced."

The following notice of Mezereon will serve as an illustration of the manner in which Dr. Garrod has carried out his design:—

"THYMELACEÆ.

MEZEREUM, Mezereon. The dried bark of *Daphne Mezereum*, or Mezereon; Linn. Syst. *Octandria Monogynia*; or *Daphne Laureola*, the Spurge Laurel. The latter is chiefly found in commerce; indigenous.

Description. Thin, flat, or curled pieces of various lengths; tough, of a brown colour outside, but white and fibrous within, with slight odour, taste hot and very acrid.

Prep. and Comp. An *acrid volatile oil*, *acrid resin*, and a crystalline principle; *daphnin.* When the root is boiled in water, an acrid vapour rises.

Off. Prep. It is contained in DECOCTUM SARZÆ COMPOSITUM.

Therapeutics. Mezereon is a powerful local irritant, and even vesicant; it causes vomiting and purging in large doses, but in small ones diaphoresis and diuresis. Used in chronic rheumatism, syphilis, scrofulous and skin diseases. Seldom given in this country, except in the compound decoction of sarsaparilla. In America an ointment is used.

Dose. Of compound decoction of sarsaparilla, 1 fl. oz. to 2 fl. oz. or more."

The above description, which includes everything that is absolutely essential for the medical practitioner and medical student to know, may be taken as a fair specimen of the others.

Such a text-book cannot but prove a useful guide to medical practitioners, and to those students of materia medica who are not called upon to look deeply into the science, and even to the latter class it will serve as an introduction to the larger and more comprehensive works of Pereira, Christison, Wood and Bache, etc.

Although we thus gladly admit that the work of our author contains much that is good, we must at the same time state that it is by no means free from errors. Some of these, as want of clearness of description, and wrong spelling of technical terms, have doubtless arisen from the desire of the author to get his work published as soon as possible after the issue of the British Pharmacopœia; but others having been recently pointed out in this Journal and elsewhere, we cannot but regret to have to refer to again from their occurrence in the present volume. We trust, however, that a new edition will be speedily called for, and thus afford our author another opportunity of carefully revising the work, and make it still more worthy of the high reputation he has deservedly acquired.

A COMPANION TO THE PHARMACOPŒIA; comparing the strength of the various Preparations with those of the London, Edinburgh, and Dublin, United States, and other foreign Pharmacopœias; with Practical Hints on Prescribing. By PETER SQUIRE, F.L.S., Chemist on the establishment of the Queen, Chemist in Ordinary to the Prince of Wales and the Royal Family, late President of the Pharmaceutical Society.

The defects and deficiencies of the British Pharmacopœia have been felt and admitted to be so numerous, and some of them so important, that those for whose use the work was intended have hesitated in adopting it as their accredited guide, and appear at the present time to be waiting for the Medical Council to give it the value and authority that such a work ought to possess. On its first appearance, all those interested in the subject were anxious to know what changes would be effected by it; at present, the anxiety is rather to know what changes are to be made in it, or what explanations can be given that may reconcile medical men and pharmaceutists with reference to the points on which dissatisfaction has been expressed. Several little works have appeared, having for their object the explanation of changes effected by the introduction of the British Pharmacopœia, and tending to facilitate its adoption by prescribers and dispensers. These, although useful in their way, may all be considered as having rather an ephemeral object, and they have therefore been brought out in an inexpensive form. It has been thought indeed, as the British Pharmacopœia is published in English at rather a high price, and as the copyright of the text is secured to the Medical Council, so that it cannot be brought out by other authors in a new dress, it might reasonably be expected that it should contain all that is requisite for its comprehension and application. Being in the vernacular language, a translation is not required, and it could not very well be annotated as our Pharmacopœias have hitherto been, without using the text upon which to found the annotations, which would probably be considered an infringement of the copyright. We have had no intimation therefore of any work, such as Phillips's 'Translation of the Pharmacopœia' being in contemplation, nor indeed is there the same occasion for such a work now as there has been formerly, for the British Pharmacopœia is much more full in descriptive and explanatory details than any of our previous Pharmacopœias have been. The defects which unfortunately exist in the new Pharmacopœia are not such as a commentator could set right; they can only be corrected by the high medical authority from which the work emanates.

Under these circumstances there has naturally been some speculation with reference to the purport of Mr. Squire's book. It was difficult from its title to say what was its principal object, or what position it was intended to occupy with reference to the Pharmacopœia. Was it to be emendatory, or explanatory, or supplementary? The first of course it could not be, unless it were suggestively, without the authority of the Medical Council; but there was scope enough for an explanatory and supplementary work, although, as already stated, it would be difficult to give to such its full value without embodying the text of the Pharmacopœia, and thus to some extent superseding the use of that work. This obviously was not contemplated by the author, for 'A Companion to the Pharmacopœia' clearly implies that it is to be used with the Pharmacopœia, and not as a substitute for it. On looking through Mr. Squire's book, we find that although much of the substance of the Pharmacopœia is used, yet it is but rarely that the text is quoted literally. It is generally much abbreviated, and sometimes essentially altered, so that the new version cannot be taken fully to represent the original. The alterations are some of them given, we presume, as suggested amendments, and in this class may be included the method adopted of expressing the quantities of ingredients in some of the formulæ by numbers, without indicating any specific weights or measures. The author states in the preface,—"I have, as far as practicable, expressed the formulæ in parts, which may be regarded either as pounds, quarter pounds, or ounces, or indeed any weights, English or foreign. The liquids, however, are always directed to be measured; I have therefore placed at the top of each page this general direction, *Solids by weight, liquids by measure.*" This, as the author says, he has been able to carry out only partially, for there are many cases in which it is found to be inapplicable. We confess we think it of very questionable utility even in cases in which the author has applied it. Take, for instance, a very simple case, that of *Unguentum simplex.* This, by the new method, is represented thus: —"Prepared lard, 3; white wax, 2; almond oil, 3; melt together." In the Pharmacopœia the quantities are given as ounces by weight of the solids and fluid ounces of the liquid, and as long as the quantities used are limited to ounces, these, or any other numbers bearing the same relation to each other, may be used; but suppose the operator wishes to substitute pounds for ounces, he has in this case to make a calculation of the quantity of oil by measure that will correspond with the altered weight of the solids. Or suppose the operator wants to make ten gallons of *Acidum Sulphuricum Aromaticum;* turning to the Pharmacopœia, he finds a formula which yields two pints, and as he requires forty times this quantity, he very easily calculates the quantities of ingredients, which will be 6 pints of sulphuric acid, 10 gallons of rectified spirit, 5 pounds of cinnamon, and 3 pounds 2 ounces of ginger. But now, turning to the "Companion," he finds another version of the formula, in which we have, "sulphuric acid, 3; rectified spirit, 40; cinnamon, in powder, 2; ginger, in powder, $1\frac{1}{4}$; macerate for seven days." There is surely as much calculation required here as in the other case, or we should say rather more. In this case too, by abbreviating the formulæ an essential part of the process is entirely omitted, so that if the "Companion" were consulted and not the Pharmacopœia, the product would not be such as the Pharmacopœia orders. In the formula for *Syrup of Tolu*, a curious instance occurs of mystification resulting from the adoption of this new method of expressing quantities. The process is thus described:—"Balsam of Tolu, $1\frac{1}{4}$; sugar, 32; water, 20; boil the balsam half an hour, adding water when required; filter, add sugar, and dissolve. When finished, weighs 48 oz., and measures 64 oz. sp. gr. 1·33." We think it would puzzle any other than an accomplished pharmaceutist to make anything intelligible out of this, and yet the process as given in the Pharmacopœia is perfectly simple, clear, and well described. If liquids as well as solids had been ordered by weight, as is the case in some of the Continental Pharmacopœias, the use of simple proportional numbers would, of course, have greatly simplified the formulæ; but while liquids are measured, we do not see that any advantage results from the plan adopted by the author.

The arrangement of the matter in the "Companion" is different from that in the Pharmacopœia, and is no doubt considered better; for unless there were some special object in altering the arrangement, the simultaneous use of the two works would have been easier if they had both been arranged alike. In both the arrangement is alphabetical, but in the Pharmacopœia the Materia Medica part is separated from the preparations whilst in the "Companion" they are put together, the preparations being described under the heads of the principal drugs used in producing them, as is usually done in works on Materia Medica. The adoption of this plan, we think, gives to the work less of a pharmaceutical character than it would otherwise have.

In the processes there is not much of an emendatory character, and yet it cannot be said that there is nothing of this character. In a few instances, such as those of *Liquor Fe ri Perchloridi* and *Tinctura Ferri Perchloridi*, where glaring defects exist in the Pharmacopœia processes, they are pointed out, and suitable remedies are suggested. The value and importance of these suggestions make us regret that the author, whose skill and experience in pharmaceutical operations are well known, has not entered more generally and fully into that class of annotation in his book. The process for *Spiritus Ætheris nitrosi* is condemned, as also is the substitution of the strong fuming nitric acid of 1·5 sp. gr. for the weaker acid of the London Pharmacopœia, and the process for collodion is set right, while the new process for spirit of sal volatile is very justly commended. But in most cases the processes are passed over without comment, not however without alteration, for, as we have already said, most of the matter, and especially the processes, taken from the Pharmacopœia, are expressed in altered terms, often much abbreviated, and sometimes from this cause rendered obscure. In some cases there are obviously intentional deviations from the Pharmacopœia instructions, some of which may be improvements, although we do not think them always so. One thing, however, we decidedly object to, and that is, that there is nothing to indicate which part is in accordance with the Pharmacopœia and which is not. This character in the work entirely precludes its use in any other way than as a companion to the Pharmacopœia, which was probably intended.

The work does not partake much of an explanatory character, yet to a certain extent brief explanations are given, especially where tests are described. Thus in the first article, on Acacia, the test for Gum Arabic is extended, improved, and explained. In the article on Acetum, after giving the Pharmacopœia test, the following explanatory sentence is added:—"Indicating absence of hydrochloric acid, lime, and metals." This should have been, *indicating the absence of more than a minute quantity of sulphuric acid and lime, and the entire absence of lead, copper, and tin.* To the test for arsenious acid is appended, "the iodine converts the arsenite of soda into arseniate." It would have been well in this case to have explained how it does so, for those who understand the *modus operandi* of the test do not require to be told what the result of the reaction is. The explanations given in this way, however, are generally very brief, but not always so much so as in the above instance, and sometimes they are full and sufficient.

But the principal object of the book cannot be said to be either that of suggesting amendments or of explaining processes and reactions; it is rather that of supplementing the Pharmacopœia with matter likely to be useful to those by whom such works are consulted. Thus, with reference to salts and many other substances used in medicine, we have a statement of their solubilities and solvent powers. Of definite chemical substances the chemical equivalents are frequently, although not invariably given. As these may be used by students, we cannot avoid remarking here that great carelessness is evinced in this part of the work, so that no reliance can be placed on the numbers representing the chemical equivalents of compound bodies. In the Pharmacopœia a table of the equivalent weights of elementary bodies is given at the end, constituting Appendix C, and it was a very simple and easy thing to calculate and give the equivalents of compounds where their composition is represented, as it is in the Pharmacopœia, by symbolical formulæ. On looking over these however, we find them in a great number of instances to be wrong. Thus referring to "*Acidum Arseniosum*," the English name of this is changed from "*arsenious acid*" as given in the Pharmacopœia to "*white arsenic sublimed.*" To this is added "Teroxide of arsenic, AsO_3, eq. 75." Now 75 is the equivalent of *arsenic*, that is the metal *arsenicum*, and it is so given in the table already referred to, it does not, therefore, represent *arsenious acid*, the equivalent of which is 99. The equivalent of *benzoic acid* ($HO, C_{14}H_5O_3$) is given as 112, it should have been 122; that of *tartaric acid* ($2HO, C_8H_4O_{10}$) is given as 75, whereas, according to the formula, it should have been 150. The equivalent of *phosphate of ammonia* ($3NH_4O, PO_5, + 5HO$) is given as 143, it should have been 194; that of *arseniate of iron* ($3FeO, AsO_5$) is given as 274, it should have been 223; that of *carbonate of lead* ($2(PbO, CO_2) + HO, PbO$) is given as 134, whereas the number representing the formula would be 387·5; what the number 134 is intended to represent we cannot conceive. The equivalent of *citrate of potash* ($3KO, C_{12}H_5O_{11}$) is given as 100, it should have been, according to the formula, 306; that of *carbonate of potash* ($KO, CO_2 + 2HO$) is given as 83·5, it should have been, according to the formula, 87. These are a few and only a few out of numerous cases of a similar description, which are much to be regretted, and the occurrence of which it is difficult to account for. With reference to medicines ordered in other Pharmacopœias as well as the British Pharmacopœia, their relative strengths, as ordered in the several works referred to, are indicated, although not always correctly, as, for instance, in the case of *infusion of senna*. The doses of medicines are also given, and, above all, their medicinal properties are described. This latter part of the matter comprises what is referred to in the title-page as "practical hints on prescribing." We have no doubt this will prove to many a very acceptable part of the information contained in the book, as some dissatisfaction has been expressed at the absence of such matter from the Pharmacopœia. The author states, with reference to this part of his work, that he has "collated it from the best authorities," and this statement was perhaps necessary to justify the introduction of strictly medical matter by a pharmaceutist. It must not be supposed that these practical hints on prescribing are intended for the use of Pharmaceutical Chemists, or that the full description given of the therapeutic action of medicines affords an indication of the amount of knowledge of this sort required by the chemist and druggist. This part of the matter is no doubt intended for medical men; and the author says, in the preface, "knowing something of the wants of both pharmaceutists and prescribers, I have endeavoured to make the book as practical as possible, and I trust that the labour bestowed upon it will not be without some result."

THE PRESCRIBER'S ANALYSIS OF THE BRITISH PHARMACOPŒIA. By J. BIRKBECK NEVINS, M.D. Lond., Lecturer on Materia Medica in the Liverpool Royal Infirmary School of Medicine. Second Edition. London: John Churchill and Sons. 1864.

The first edition of this useful little work was noticed by us in our issue for April last, page 523. The present edition may almost be regarded as a new work, for it appears to have been carefully revised, and has been so much enlarged that it contains about three times the amount of matter as formerly. We can recommend it to our readers as a useful and reliable guide to the British Pharmacopœia.

PHARMACEUTICAL CONFERENCE.

Intending visitors to Bath at the meeting in September who require accommodation are requested to communicate their wishes to the Local Secretary, in order that such accommodation may as far as possible be secured for them.

JOHN C. POOLEY, *Local Secretary.*

8, *George Street, Bath.*

BOOKS RECEIVED.

Manual of the Medicinal Preparations of Iron, including their Preparation, Chemistry, Physiological Action, and Therapeutical Use. With an Appendix, containing the Iron Preparations of the British Pharmacopœia. By Harry Napier Draper, F.C.S. Dublin: Fannin and Co., Grafton Street; London: Robert Hardwicke; Edinburgh: Maclachlan and Co. 1864. (From the London Publisher.)

Selecta è Prescriptis. Selections from Physicians' Prescriptions; to which is added a Key, containing the prescriptions in an unabbreviated form, with literal translation. For the use of Medical and Pharmaceutical Students. By Jonathan Pereira, M.D., F.R.S. Fourteenth edition. London: John Churchill and Sons, New Burlington Street. 1864. (From the Publishers.)

The British and London Pharmacopœias compared; with an abbreviated Materia Medica: giving the Chemical Symbol, Equivalent, Natural Order, Habitat, Properties, Strength, and Dose of Every Article in the British Pharmacopœia. By George Barber, Pharmaceutical Chemist. Second Edition, revised and enlarged. London: Simpkin, Marshall, and Co. 1864.

TO CORRESPONDENTS.

To be placed on the Register as a Pharmaceutical Chemist and to participate in the privileges of Membership, it is necessary to pass the Examinations as indicated in the Regulations of the Board of Examiners (Copy of which may be had of the Registrar).

The Board do not require that any special course or courses of Lectures or Laboratory instruction should have been attended; if the Candidate evince an acquaintance with the subjects on which he is examined, the usual Certificate of competency is granted, and he is Registered accordingly.

X. Y. Z. (Rochdale).—The Quinine may be recovered from the solution by precipitating with Carbonate of Soda.

A Constant Reader.—The Proposed Pharmacy Act. See Section 5 of the proposed Act, 'Pharmaceutical Journal,' page 556.

Vir (Newcastle-on-Tyne).—A so-called "Patent Medicine," recommended for the relief or cure of any complaint, requires a Stamp, and can be sold only under a Patent Medicine Licence, whether a Patent be taken out for it or not.

Aqua Destillata (Manchester).—(1) It is not probable that a new edition of the British Pharmacopœia will be published in less than twelve months from the present time. (2) The required information will be obtained on application, by letter, to the Secretary, 17, Bloomsbury Square.

B. R. (Buxton).—Such a knowledge of the Pharmacopœia is required that would indicate an acquaintance with all the more important preparations and their constituents. The Regulations of the Board of Examiners may be obtained of the Secretary.

Chemicus.—Nitro-prusside of Sodium may be obtained of any Operative Chemist. See any text-book of Chemistry.

Inquirer (Aberdare).—(1) Riddle's Latin Dictionary. (2) Apply, by letter, giving name and address, to the Secretary, 17, Bloomsbury Square.

B. (Whitchurch, Hants) proposes that "a Central Office should be established, where both Principals and Assistants could apply respecting Situations; a payment of Five Shillings to be made on being suited." [We beg to remind our Correspondent that such a Central Office already exists at 17, Bloomsbury Square, where a book is kept for the names of applicants, whether belonging to the Society or not, and free of any charge.]

A Young Member.—Pereira's 'Materia Medica and Therapeutics.'

An Apprentice (Manchester).—Fownes's 'Manual of Chemistry,' and Bentley's 'Manual of Botany.'

Instructions from Members and Associates respecting the transmission of the Journal before the 25th of the month, to Elias Bremridge, Secretary, 17, Bloomsbury Square, W.C.

Advertisements (not later than the 23rd) to Messrs. Churchill, New Burlington Street. Other communications to the Editors, 17, Bloomsbury Square.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VI.—No. II.—AUGUST 1st, 1864.

SEPARATE EXAMINATIONS FOR CHEMISTS ALREADY IN BUSINESS ON THEIR OWN ACCOUNT.

Our readers will see, by the Pharmaceutical Transactions, that the propriety of examining chemists already in business on their own account, apart from younger members of the trade who may more properly be termed "Students," has been again under consideration of the Council, and it has been decided to institute such an arrangement. We believe this resolution will find general favour. Had compulsory powers been given in the Pharmacy Act of 1852, such a step would now be unnecessary, but as submitting to the ordeal has been hitherto and is still only voluntary, it is desirable to remove as many obstacles as possible. The bringing together Principals and Assistants for examination has always been regarded as an obstacle to the former, who may naturally feel a disinclination to descend from an established position and once more stand at the gate for admission, side by side with those who have perhaps only twelve months previously emerged from apprenticeship. In the event of the passing of the proposed amendment of the Pharmacy Act, the necessity for these separate examinations would in a few years cease to exist, as no chemists would after that period commence business without previous test of qualification; but for the present we think the proposition wise, and calculated greatly to assist those who deem mere *registration as "Chemists and Druggists"* somewhat derogatory. In reality such registration would secure and perpetuate all vested interests, and indeed improve the position of men so registered; but by this proposal the way to distinction would be rendered less difficult, and easier access to membership of the Society provided. It was stated in our Journal of last month that an increased desire for Membership was made evident by the inquiries so constantly sent to the Secretary by "*chemists and druggists already engaged in business on their own account*," and that "*the more firmly the application of a test of qualification is adhered to as a necessary condition to membership, the more is the attainment of the object desired, and the more when attained is it appreciated.*"

From this proposition none will dissent, not even the candidates for examination, and we do not understand, by receiving two different classes at the examiners' table at two separate times, the Board has any idea of smuggling unqualified men into membership. Nevertheless, although both may be tested for the same knowledge, there should be a wide distinction in the manner of examining them,—the one more practical than the other. The Student fresh from his books and experimental laboratory must bring proof of his acquaintance with the elements which are to fit him for the service of the public; he will naturally be more at home in the language of the schools; he may have been a diligent apprentice and a trustworthy assistant, but he has not been called on to take the full responsibility, unaided by the supervising care of a master, of a dispensing establishment; let him not however be misled by what we say on this point, his examination is practical as well as technical, and a want of familiarity with the practice of the dispensary would be fatal to his hopes, but it is important that in technicalities he should be more perfect, as he has to give evidence that he is qualified *to begin;* whereas the man who has not only begun, but creditably conducted his business for a period of five years, brings a certain amount of evidence that he possesses the right foundation, and his examination should therefore be more—much more—practical than technical. He has already utilized his education, in reality improved it, and yet might not pass muster so well in a mere technical questioning as his juvenile competitor.

A schoolboy at the end of his pupilage passes a severe ordeal and takes high honours, an ordeal fitted for advanced pupils, but the time has gone by when such an one was regarded as an educated man: the real work of education is now to begin with him, and he has only shown his ability, cultivated ability we may call it, to proceed with the work.

And this holds good with special or "*professional*" education as well as general.

A student of history, if he be not a teacher also, may have forgotten the actual dates of the Conqueror's landing in England, the signing of Magna Charta, or the expulsion of the Stuarts; but he has nevertheless a very clear appreciation of the influences these events have exercised on the character and liberties of Englishmen. So too in Botany, one branch of study indicated for Pharmaceutical Chemists by our Act of Parliament; it is well known that many of the elements of the science, we mean the exact details of classification, are but matters of memory, and unless a man is handling flowers continually he forgets them; but they have assisted him and taught him great principles; he has generalized the information obtained by their means, knows the indigenous medicinal plants when presented to him, and possesses such an acquaintance with the vegetable substances employed in medicine as renders him a safe vender or dispenser for the service of the public. He has attained the end for which he studied, and the examiners finding him so qualified need not make him recount the steps by which he ascended the tree of knowledge,—he has plucked and applied its fruit.

We are quite aware that one of the greatest responsibilities of the Council lies in the Examinations; they are the very foundation of the Society, and the maintenance of their integrity is the tenure by which its privileges are held. To reduce these examinations to a mere farce would be to destroy their value both in the eyes of the public and of pharmaceutists; to break faith with the Legislature which enacted the law, and with those who have been examined under it; therefore we should not be slow to denounce and warn our readers against any proposal which could have such an effect, although that proposal might be one which would for the moment increase the numerical strength of the Society. We have to look to the future, consider well the previous conduct and progress of the Institution, maintain that which is right, amend that which needs alteration, and above all things adapt our laws and regulations to the requirements of the time, always regarding as indispensable the *educational qualification* to establish which our Society was formed. In considering our progress we are by no means discouraged; let those who say we have done nothing look to the late examination lists,—the number of candidates will indicate the estimation in which the seal of the Society is held, and satisfies us as to progress. The proposed regulation we take to be a necessary adaptation to circumstances, which if carried into execution fairly and honestly by the Board of Examiners will be of service alike to the Society, and to those chemists and druggists who, although well qualified for their business, have reasonable scruples about coming up for examination in company with the Students presenting themselves monthly.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *July 6th*, 1864,

Present — Messrs. Bird, George Edwards, Evans, Hanbury, Haselden, Hills, Mackay, Morson, Orridge, Sandford, Savage, and Squire,

The following were elected—

MEMBERS :—

Charles Symes	Birkenhead.
Abraham Johnson Dyer	Brixton.
Godfrey Watson Brewster	Cambridge.
John Mills	Chester.

The following, having severally paid their Arrears and the Registration Fee for the current year, were

RESTORED TO MEMBERSHIP :—

Frederick Telfer	Leytonstone.
Edward Pearson	Liverpool.
Luke Pearson White	Penistone.
John Whitwell	Peterborough.

The President for the time being of the Pharmaceutical Society of Victoria, was elected an Honorary and Corresponding Member of the Pharmaceutical Society of Great Britain.

Resolved—That Separate Examinations be instituted for Chemists and Druggists engaged in business on their own account, provided always that such persons have either been in business for *five* years or are *thirty* years of age.

That the first of such Examinations be held in October, and that due notice thereof be given in the Journal and Transactions.

BENEVOLENT FUND.

The following subscriptions to the Benevolent Fund were received during June :—

	£	s.	d.
Bishop, Thomas, Woolwich	£0	10	6
Bostock, William, Ashton-under-Lyne	0	5	0
Cooke, William, Norwich	0	5	0
Christopher, Wm., Crickhowell	0	5	0
Ellis, Richard, Thornbury	0	5	0
Gardener, Charles, Tunbridge Wells	0	5	0
Gibbs, William, Ryde, I. W.	£0	10	6
Gudgen, George B., Kimbolton	0	5	0
Jenkins, Joseph, Nottingham	0	10	0
Patterson, George, Stamford	0	10	0
Strawson, Henry, Crewkerne	1	1	0
Sutton, Francis, Norwich	1	1	0

REGISTERED APPRENTICES, *July 20th*, 1864.

NAME.	RESIDING WITH	ADDRESS.
Bowles, William James	Mr. Harrington	Rochford.
Deane, James	Mr. Deane	Clapham.
Hitchcock, Arthur Wm.	Mr. Hitchcock	Oxford.
Mason, Robert William	Messrs. Garratt	Rugby.
Sheldon, Benjamin	Mr. Greaves	Bakewell.
Steward, John Alfred	Mr. Davis	Leominster.
Trist, Richard	Mr. Turney	Plymouth.

EXAMINATION, *Wednesday and Friday, July 20th and 22nd,* 1864.

MAJOR.

Appleton, Robert	Sheffield.
Berdoe, Edward	London.
Bingley, John	East Retford.
Chambers, James	Belper.
Faulkner, James M.	London.
Gowland, George R.	Sunderland.
Griffith, William H.	Bristol.
Hickman, William	Maidstone.
Hitchcock, Chas. G.	Oxford.
Mayfield, John Thos.	Wolverhampton.
Norrish, Henry	Crediton.
Pasmore, Frederic Rich.	London.
Watts, John	London.

MINOR.

Barnett, Alexander	Buxton.
Barton, Henry	Newark.
Child, Henry	Halesworth.
Farnsworth, Thomas	Codnor.
Fitt, Francis E.	Barking.
Garside, Thomas	Southport.
Hearder, Harry P.	Plymouth.
Hudson, John William	Bradford.
Isherwood, James	London.
Martindale, William	Carlisle.
Moulton, James E.	Northampton.
Oldfield, Francis	Dover.
Sargent, George W.	Liskeard.
Wearing, Richard H.	Liverpool.

EDINBURGH.

MAJOR.

Hampson, Robert	Alderley Edge, Cheshire.

Erratum.—Vol. V. page 592, for "Howell, Maurice, 5*s*." read "10*s*. 6*d*."
Vol. VI. page 6, for "John C. Appleton" read "Thomas C. Appleton.'

ORIGINAL AND EXTRACTED ARTICLES.

ON THE RED VARIETY OF PITAYO BARK.

BY J. E. HOWARD, F.L.S., ETC.

Mr. Robert Cross, who was employed to collect seeds of the Chinchonæ on behalf of the Indian Government, in the district of Popayan, sent over recently the bark, together with the seeds, of that which he calls "the red variety of Pitayo, the best of all." He gave ten ounces of this bark to Dr. Jameson, of Quito, who says it is the true Pitayo bark of New Granada, and extracted 3·2 per cent. of quinine from it. Mr. Markham, in sending me the seeds, writes as follows:—"I enclose some specimens of bark and some seeds of *Chinchona*

Pitayensis, collected by Cross last August. They were collected from trees growing on lofty ridges near Popayan, where it sometimes freezes,—temperature 30° to 60° Fahrenheit."

Chinchona Pitayensis, red variety.

Chinchona Pitayensis, orange variety.

The bark was at once recognized as the superior quality of Pitayo bark, which bears a high value in this market, as well as in Paris, equal in fact to that of Calisaya. From a small portion of that given to me, gathered by Cross, I obtained the surprising amount of 8·6 per cent. of alkaloid soluble in ether, and the portion which formed crystalline salts indicated like results with those mentioned by Dr. Jameson.

There is, I believe, no doubt that this is the same sort of bark which was given by M. Delondre to Dr. de Vry, described by him as the root-bark of *C. lancifolia*, and from which Dr. de Vry obtained 8·66 per cent. of alkaloid. If I understand rightly, this identity is admitted on all sides; but the questions remain,—First, is it the produce of *C. lancifolia* (Mutis)? Second, is it root-bark at all? As to the first question, it is certainly an error to identify the *C. Pitayensis* with the *C. lancifolia* (Mutis). I send a drawing of the *C. Pitayensis*, which was made by Mr. Fitch from specimens gathered by Mr. Jervise, and now found in the herbarium of Sir William J. Hooker, at Kew. They comprise the *roja*, or red, and *naranjada*, or orange, varieties,* and are accompanied by characteristic specimens of the bark of these two sorts. Between these no botanical difference that I am aware of can be traced, and both constitute a species markedly distinct from the *C. lancifolia* (Mutis),† which has been very well figured both by Weddell and Karsten; whilst the *C. Pitayensis* has never till now been represented, as far as my knowledge extends, although it is certainly one of the very best kinds of Chinchona, and far superior to the *C. lancifolia* (Mutis), which last has been for a long time almost entirely neglected by the collectors.

In the next place, is it root-bark? I presume not, as Cross never intimates anything of the kind respecting the specimen bark which he sent home. The appearance of the bark, which is peculiar, might most readily correspond to that which would be produced by shrubs, growing high up the mountains, and in so low a temperature as is above described. This is exactly the climate and circumstances to favour the production of quinine in the bark, as has been well shown by Dr. Karsten, and exemplified also in the Calisaya of St. Fé in particular. No doubt the Indian Cascarilleros may strip roots and all, and mix these with the bark, and, in the fragmentary condition in which it comes, it is impossible to distinguish the bark of the different parts of the plant; but the extraordinary produce I must persist in believing to be due to the circumstances above-named, and not to that of its being root-bark, which, as regards the great bulk of the collection, I do not believe.

Whilst compelled to differ on this point, I most willingly bear my testimony to the great value of the table given in last month's Pharmaceutical by Dr. de Vry. The exactness and fidelity with which these able researches are reproduced, enable all persons to form their own conclusions, and to me the results seem to indicate a general inferiority in the root-bark, as compared with the trunk of the Calisaya.

ON THE DETERMINATION OF THE AMOUNT OF ALKALOIDS IN CINCHONA BARK.

BY DR. J. E. DE VRY.

Although there exist many methods of ascertaining the amount of alkaloids in the cinchona bark, my connection with the cinchona cultivation in Java compelled me to select one which would not only afford *comparable* results, but one in particular which would yield the different alkaloids *as they are contained in the bark, without alteration from the chemicals used for their extraction.*

It appeared to me that the method described by my friend A. Delondre‡

* I have also from Paris the *morada* and *blanca* varieties exhibited in sections of branches, but not in flowers or fruit.

† I have specimens given by Mutis to Bonpland, and presented by the authorities of the Museum of the Jardin des Plantes; also an excellent specimen gathered by Dr. Karsten.

‡ Delondre et Bouchardat, 'Quinologie,' p. 44.

for the preparation of his so-called *quinium*, could be easily adapted for my purpose; and the result of my experiments proved that I had made a right choice. My method, which has been applied to the investigation of the Neilgherry barks, is the following:—

The powder of the bark is dried at 212° Fahr., and the weight ascertained in the dry state. If possible, it is always preferable to use the *same* quantity. It is now mixed with a quarter of its weight of slaked lime, and this mixture boiled with ten times its weight of spirit of sp. gr. 0·85 during five minutes. The whole is now put into a filter, and exhausted by successive quantities of boiling spirit, making the whole quantity of spirit used equal to twenty times the weight of the bark. The alcoholic solution, after having been acidulated by dilute acetic acid, so that litmus paper becomes reddened, is evaporated on a water-bath till all the alcohol has been expelled. The residue of the evaporation is now repeatedly treated with water till the filtered liquid is no longer rendered turbid by an alkali. The watery solution thus obtained contains all the alkaloids, whilst the quinovic acid, fatty and resinous matter, etc., remain upon the filter. If this filter, with its contents, be duly treated with milk of lime, the quinovic acid can be determined. The watery solution of the alkaloids is next brought to a *small* volume by evaporation on a water-bath, and then mixed with an excess of slaked lime, by which the alkaloids are precipitated. The whole is now thrown upon the smallest possible filter and washed with a minimum quantity of cold water. If properly managed, the quantity of water necessary to remove the colouring matter is so small, that the loss of alkaloids by their little solubility in lime-water can be neglected; and if in a series of investigations care is but taken to work under the *same* conditions, as to size of the filters, etc. etc., the small loss before mentioned has not the least influence on the comparability of the results. After the filter has been properly washed, it is dried and boiled repeatedly with alcohol of 0·82, till the alcohol dissolves nothing more. After filtration the slightly coloured alcoholic solution is evaporated in a small weighed platinum vessel, and the residue heated on the water-bath until its weight ceases to diminish. The amount of the alkaloids in the bark is now known, and to ascertain the quality of the different alkaloids, they are dissolved in the smallest possible quantity of *very dilute* acetic acid. Sometimes there remains a trace of resinous matter undissolved, but in the majority of cases this trace need not be noticed. If, however, in an exceptional case, the resinous matter is in such quantity that it can be weighed, its weight must be ascertained and subtracted from the amount of alkaloids. The acetic solution of the alkaloids is now placed in a closed funnel, provided with a cock, and agitated with a slight excess of caustic soda and a quantity of ether equal to fifteen times the weight of the alkaloids. After this agitation, the whole must stand at least six hours; for, although cinchonidine and quinidine are sparingly soluble in ether, a large amount of them is dissolved upon the first agitation, but is separated in crystals after a few hours. The ethereal solution is now evaporated, and the residue heated on a water-bath till its weight remains constant. This residue is quinine, containing traces of cinchonidine, quinidine, or cinchonine, and in many cases a large amount of the still unknown fusible alkaloid. By the known reactions of chlorine and ammonia, and by the preparation of herapathite, the real nature of this residue can be ascertained. The alkaloids which have not been dissolved by the ether are now again dissolved in the smallest possible quantity of dilute acetic acid, and this solution mixed with a few drops of a concentrated solution of iodide of potassium. After stirring the liquid with a glass rod, there will appear a sandy crystalline precipitate if quinidine is present. In such case, the hydriodate of quinidine is collected upon a filter, dried at 212° Fahr., and its weight ascertained, whilst the amount of pure quinidine can be ascertained by calculation from the known weight of the hydriodate; 100 parts of hydriodate are equivalent to 71·68 parts of quinidine, according to the formula $C_{40}H_{24}N_2O_4, HI$. The liquid separated by a filter from the hydriodate is precipitated by caustic soda, and the precipitate noted as cinchonine, or as a mixture of cinchonine and cinchonidine, which depends upon special observations. If the solution of iodide of potassium produces no precipitate, the solution is precipitated by caustic soda, and the precipitate may be regarded as cinchonine, or as a mixture of cinchonine and cinchonidine. The presence of cinchonidine or quinidine among the alkaloids of a bark can be easily conjectured at the time of their treatment with ether; for if one of these alkaloids is present, it is partially deposited in a crystalline state after some time. Whilst the quinidine can easily be ascertained by iodide of potassium, even in small quantities, the presence of *small* quantities of cinchonidine can only be ascertained *with certainty* by the polarizing apparatus, by which instrument I have, for instance, found the cinchonidine of Pasteur in the bark of *C. pahudiana*, of Java.

The Hague, April 21, 1864.

THE RICE-PAPER OF FORMOSA.

BY ROBERT SWINHOE, H.M. CONSUL AT FORMOSA.

The plant that produces the so-called rice-paper is the *Aralia papyrifera* of botanists, a low shrub with large leaves, in form not unlike those of the castor-oil plant (*Ricinus communis*). This plant has as yet only been procured from the northern end of Formosa, where it grows wild in great abundance on the hills. It is of very quick growth, and the trunk and branches, which are lopped for use, are not unlike those of an old elder in appearance. The cellular tissue or pith attains its full size the first year. The trunks and branches are mostly procured from the aborigines of the inner mountains, in barter for Chinese produce. They are rarely straight throughout their length, and are usually cut into pieces of about nine inches long, and with a straight stick inserted at one end and hammered on the ground, the pith is forced out with a jump at the other end. The pith is then inserted into straight hollow bamboos, where it swells and dries straight. If too short to form the required breadth of paper, several bits are inserted into a hollow bamboo, and, by rods inserted at both open ends of the bamboo, pressed together until dry. By this process the short bits are forced to adhere together and form one long straight piece of the required length. Thus paper of almost any size can be procured. The knife used in paring the pith into paper is in shape not unlike a butcher's chopper. It is well sharpened on a stone, and when not used, kept with the edge in a wooden groove held firm to it by two strings round the wood and the knife. Before using it, the edge receives a fresh touch up on a small block of wood, usually a piece of the timber of *Machilus ramosa*, shaped like a large hone. The block on which the pith is cut consists of a smooth brick or burnt clay tile, with a narrow piece of brass on a rim of paper pasted at each edge, on which the knife is laid, and is consequently a little raised above the bare tile itself. The block is laid flat on a table, and the dried pith rolled on it with the fingers of the left hand, and then the knife laid on the brass rims with its edge towards the pith, its handle being held by the right hand. As the knife is advanced leftwards by the right hand, the pith is rolled in the same direction, but more slowly, by the fingers of the left. The paring thus goes on continuously, until the inner pith, about a quarter of an inch in diameter, is left, resembling somewhat the vertebral column of a very small shark, and breaking into similar concave-sided joints. This is used by the Chinese as an aperient medicine. The paring produces a smooth continuous scroll about four feet long, the first six inches of which are transversely grooved and cut off as useless. The rest shows a fine white sheet. The sheets, as they are cut, are placed one upon another and pressed for some time, and then cut into squares of the required size. The small squares made here are usually dyed different colours, and manufactured into artificial flowers for the adornment of the hair of the native ladies; and very excellent imitations of flowers they make. The sheets most usually offered for sale, plain and undyed, are about three inches and a quarter square, and are sold in packets of one hundred each, at rather less than one penny the packet, or a bundle of five packets for fourpence. The larger-sized paper is made to order, and is usually exported to Canton, whence the grotesque but richly tinted rice-paper paintings have long attracted the curiosity of Europeans. Some of us tried our hands at paring, but made most abortive attempts, producing only chips, though the operation looked so easy in the hands of the apprentice. The term of apprenticeship to the trade is three years, during which time the man receives no pay, but only board and lodging from his master, and has to give his services as general attendant besides to his employer. When the three years are completed, the apprentice is required to work other four months, in place of paying premium. He then receives a certificate of capability, and can either set up on his own account or demand wages for hire.

ON ACCIDENTAL POISONING IN CONNECTION WITH THE RESPONSIBILITIES OF DISPENSING CHEMISTS.

BY MR. HENRY B. BRADY.

In the Journal for December, 1862, I ventured to trouble you with a few paragraphs on Accidental Poisoning, and I purpose, if you will allow me again to trespass on your space, to add somewhat to the remarks then offered.

The communication referred to was directly elicited by a melancholy accident in dispensing, which occurred at North Shields, the circumstances of which will be recollected by many of your readers. A medical man, in large practice, was called upon to answer to the charge of causing the death of one of his patients, by an error committed by his assistant in dispensing. It was in vain that he pleaded that special pains had been taken in the regulation of his surgery to guard against contingencies of this kind; that in the arrangement of the bottles, the registration of prescriptions, the mode of labelling medicines for external use, and, more than all, in the employment of experienced and highly-paid dispensers, unusual care had been exercised. The jury,—such a jury as you may find in any commercial seaport,—knowing nothing practically of the details of a dispensing-room, nor of the precautions which were admissible or desirable in the case, gave a verdict which resulted in the censure of the surgeon, and, eventually, in the award of heavy damages to the husband of his patient. There were some amongst us who were disposed to pass lightly over the event, with the remark, "Medical men should not dispense their own medicines, but leave it to those whose proper business it is,"—a sort of served-him-right verdict, which a second thought would condemn as unworthy jealousy; but there were others to whom the result caused alarm and anxiety. A precedent was established which, unless counter-measures were taken, might ruin any one practising pharmacy at any moment.

The heavy calamity which has recently befallen one of our brethren-in-arms at Liverpool brings the matter yet nearer home to us, and has filled every rightly-thinking member of our profession with feelings of the deepest sympathy. Let us pass lightly over a few of the circumstances of the present case, and draw instruction from them if we may. A pharmaceutist this time, not a general practitioner, in position and attainments equal with the best; labouring heartily for the advancement of the *status* of his profession; endeavouring to attain, and to a large degree attaining, the patronage of the public, not by having recourse to underhand or questionable means, but legitimately, by constant personal care and attention, and an endeavour to keep pace with the ever-increasing requirements of the practice of pharmacy, is the person most nearly concerned. In an unlucky hour a dispenser, in whom years of satisfactory service gave him just right to place confidence, whose one fault seems to have been the over-confidence arising from long practice, makes an error in compounding a bottle of medicine, using powdered strychnia instead of James's powder. The immediate effect need not be dwelt upon. We are informed that the principal was not aware that he had such an article as powdered strychnia on his premises, and that the crystals had, without his knowledge, been rubbed down by his assistant for convenience in dispensing, forgetting the safeguard which resides in their peculiar appearance.

It is obvious that an accident like this may occur to any one of us, even the most careful, and it is well therefore that we should look at the matter with thoughts for the future. We need not quote trite latinisms in testimony of the intimate association of error with humanity, nor can we expect our assistants to be above human weaknesses; if they understand their work, and are careful and trustworthy, we have reason to be thankful. Accidents, in the very nature of things, must happen; let us do all in our power to prevent them, but let us seek also to protect ourselves should they happen from causes beyond our control.

It is easy to see how a jury, unacquainted with the details of a dispensing establishment, and having no reliable authority on which to base their judgment, may be persuaded, or bullied, or tricked, according to the fancy of a barrister on the prosecuting side, into a belief that some precaution ought to have been taken by the chemist which he has omitted; and a tirade on a fanciful poison-bottle, or a sand-paper label, may induce a verdict utterly unjust in the magnitude of its consequences. Nor is it unnatural that the tendency of a jury, when the "safety of the public" and the "carelessness of dispensers" has been duly sounded in their ears, should be disposed to decide the case in a spirit of revenge, rather than of sober judgment. On the other side, the pharmaceutist can scarcely complain, inasmuch as the class to which he belongs, to whom the public naturally looks for information on the subject, has never given any indication as to what means may be, or ought to be, taken by the chemist so as to reduce the chance of error to the minimum. It is useless to state, that because the substances with which we have to do glide, by imperceptible gradations, from the alimentary and harmless into the virulently poisonous, we can draw no line amongst them, nor even define what constitutes a poison. The public recognize a difference, and common sense, rather than abstract science, is their guide, as it must be ours. In reading the history of the Liverpool case, we cannot avoid the conviction that, had the error occurred in the administration of an ounce of paregoric instead of a dose of strychnia, though the effect would have been the same, the verdict of the jury would have been couched in very different language.

Nearly three years ago, we understood that a committee had been appointed by the Council of the Pharmaceutical Society to consider the whole question; we even heard of a re-appointment of that committee on the formation of a new Council. Pharmaceutists would be glad to know the results of their deliberations. We can scarcely suppose that they have not produced a report; their silence on the subject can scarcely be intended to signify an opinion that no precautionary measures are of any value; if this be so, their heaviest task is still before them, which will be to convince chemists in the first place, and the public in the second, that their judgment is well founded. The Poison Bills which are periodically brought before Parliament are sufficient evidence of the views which are held outside of our own body, and we must recollect that the juries to whom cases of accident are referred are selected from the public, and not from the craft. The Society has good reason to remember these Poison Bills, from the trouble and money they have cost in the efforts, only just successful, to prevent them becoming law. It is true that the provisions of these Bills have been absurd and vexatious; but this is only what we might expect of any regulations devised by those whose zeal was in advance of their knowledge. The public *will* have precautions against accident adopted; let them be of our own choosing rather than left to the selection of a Parliamentary Committee. Were the Pharmaceutical Society, acting officially as the body governing not only the interests of its own members, but those also of the nation at large, so far as pharmacy is concerned, to issue a series of simple and reasonable regulations with respect to the storing and dispensing of poisonous substances, it would require no other authority to ensure their general adoption. Then, any chemist whose misfortune it may be (and it may happen to any of us) to fall under the notice of a coroner's jury, will have the advantage of being able to show that the system of his establishment is not at fault, and that the approved means of guarding against casualties have been thoroughly adopted; the jury, on their side, will also be benefited by having a real standard, instead of an imaginary one suggested by an excited fancy, by which to determine the merits of the case.

Recent events teach us that accident of the kind under consideration may be, and is followed by a civil action; so that, in addition to the toilsome life and poor reward often dwelt upon, and so feelingly, in your pages, the pharmaceutist has the ghost of pecuniary ruin staring him in the face, and he is deprived of the power, which consciousness of right should impart, to disarm the intruder. With the assistance of such a document as I have alluded to, his position in common law would be materially altered, if indeed the question of damages were ever brought into court. I am not sufficiently versed in law to know how far Lord Campbell's Act bears the construction which seems to be put upon it with reference to these cases, and it would have been well for us if some of the funds we see annually accounted for in the financial statement under the head of "law expenses" had been expended in ascertaining how far the provisions of the Act affect members of the Society, and in warning those whom it concerned of their increased responsibilities.

The great pity is, that the Society did not, years ago, take action in the question of accidental poisoning. Its views, then expressed, could not have failed to be taken as the basis of any Poison Bill which might have been brought into Parliament. Honourable members, knowing little about the real wants of the case, would have been ready enough to accept suggestions, sanctioned by the authority of those who have the best opportunity of forming a correct estimate, as the groundwork of legislation, being also well aware that in doing so they would secure the support of an important division of the community. We may at any time be threatened with another Bill similar in character to those which have gone before, causing us so much trouble; and if public feeling be a little excited on the subject, we shall have greater difficulties than ever in inducing a Parliamentary Committee to listen to reason, so that we may still have enactments forced upon us, not only grievous to bear, but impossible to carry out to the letter.

It was the opinion of the late Mr. Bell, that pharmaceutists had nothing to fear from a *good* Poison Bill; nay, more, that the next advance to the Society was likely to be most readily attained in connection with legislation on this question, and I agree almost entirely in what he said and wrote concerning it;

but the first essential for satisfactory movement is, that we shall agree amongst ourselves as to what precautions it is best to recommend to chemists, that may satisfy the desire of the public without undue inconvenience in the practice of dispensing. We can do nothing with the educational clauses, which he proposed should be added if these provisions were at any time embodied in a Bill, until we have settled the first point.

Feeling the urgent necessity of some action in the matter, a committee was appointed some time ago by the Executive Committee of the Pharmaceutical Conference to inquire into it; surely the Council of the Pharmaceutical Society do not mean to stand idly by whilst such questions are mooted.

Since writing the above I have received for perusal, through the courtesy of the Secretary of the Society, the report of the committee presented at the meeting of the Council last August. It is a great pity that this report was not printed in the Journal. The proposals contained in it seem to me almost unexceptionable so far as they go, but it could never have been intended as a final report; it leaves off in the middle of the "first act," and is, in fact, only the beginning of the beginning. Still, I am informed that this committee does not now exist.

TYSON'S PROCESS FOR BLUE PILL.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Dr. Attfield having pointed out to me that my communication to your periodical of the 18th ult., with respect to Tyson's process for Blue Pill, is liable to misconstruction, I shall be obliged by your affording me space for explanation. Any careful and informed reader would perceive that in alluding to the possibility of the poisonous chlor-amiduret of mercury being formed, I referred solely to the action of ammonia on the small quantity of calomel left undecomposed by the Liq. Potassæ; but all readers are not careful and informed, and therefore it may be necessary to state that the precipitate recommended by Tyson for making Blue Pill would consist principally of dinoxide of mercury, mixed with a little of the di-chlor-amiduret. The therapeutical effects, consequently, would not be by any means so violent as if the latter compound constituted the whole precipitate, as was the case in the instance which I cited in my former letter. But we like to use pure chemicals in medical practice; we are not satisfied if our calomel contain even very small quantities of corrosive sublimate, and the respected Tyson would not, if he was aware of it, wish his black oxide to be contaminated with chlor-amiduret.

I find I was mistaken in supposing that Dr. Attfield approved unconditionally of Tyson's process. He was, it appears, aware of its defects, and will, no doubt, perfectionate a much better and safer one.

I am, Sir, yours respectfully,

JOHN ALDRIDGE, M.D.

Pharmaceutical Referee to the Pharmacopœia Committee of the Medical Council.

[We do not think there is any good evidence to show that Blue Pill owes its efficacy to the presence of oxide of mercury; and there is one important objection to the use of black oxide of mercury, which is, that it becomes transformed very rapidly into the poisonous red oxide.—ED. PHARM. JOURN.]

EMPLASTRUM HYDRARGYRI, *Pharm. Brit.*

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Having had occasion to try the process directed in the new British

Pharmacopœia for the preparation of Emplast. Hydrarg., I think it desirable to acquaint my brother members of the Pharmaceutical Society with the result. On following strictly the directions, as well as the proportions given, I found that it was almost impossible to divide the mercury sufficiently by trituration with the oil and resin; and on adding afterwards the litharge plaster, the mass, instead of having a tenacious consistence, was so crumbly as to prevent its being formed into the usual rolls. I had then recourse to the formula I have used for the last forty years, viz. substituting the same weight of Venice turpentine as the oil and resin combined, thus preserving the proportions of the mercury, and found it to answer completely; the latter being much more easily divided, and the resulting plaster being of a good consistence.

I am, Sir, yours very faithfully,

THOMAS BLUNT.

The Wyle Cop, Shrewsbury, July 4th, 1864.

ON THE PROCESS OF THE BRITISH PHARMACOPŒIA FOR PREPARING LINIMENTUM ACONITI, AND ON THE MEDICAL AGENCY OF THE LINIMENTUM SO PREPARED.

BY M. DONOVAN, M.R.I.A., ETC.

Many acrid vegetable substances, which are virulently poisonous in their natural state, are rendered innocuous by being dried by heat. Such is the case with many of the Aroideæ and Ranunculaceæ. Aconite seems to be of the same character to a certain extent; and although the poison be not destroyed by drying, the noxious quality of the plant may be greatly weakened by being volatilized, or otherwise dissipated, or partially decomposed.

The following statements have been made relative to aconite:—Bucholz, while occupied in making an analysis of the leaves of aconite, was seized with headache, pain in the back, and vertigo; whence we conclude, says Berzelius, that the poison is volatile. Pereira, quoting Gieger, says that the emanations of the distilled water affect the eyes.

Statements have been made to the effect that handling the fresh plant has produced tremblings and faintness; and that in preparing the extract, the vapours have produced disagreeable symptoms, and enlargement of the pupils of the eyes, which has continued several hours. All these facts seem to point to the volatile and destructible nature of the acrid principle, and to the injury which the roots must sustain by being dried by heat.

It became a question, therefore, whether the process adopted in the British Pharmacopœia for preparing the linimentum aconiti is such as to preserve the properties of the roots of the plant without injury.

Having procured a quantity of the root in a nearly dried state, I completed the drying by spreading it out on a well-regulated hot hearth, covered with sheets of paper. Of the dried root, twenty ounces were moistened with twelve ounces and a half of rectified spirit, and macerated for seven days. The whole was then percolated with the remaining seventeen ounces and a half of rectified spirit; eight ounces and a half were held absorbed by the powder permanently, and twenty-one ounces and a half of the liniment were obtained, first cost in Dublin 7*s.* 6*d.* per pint of twenty ounces for mere materials, there being eight ounces and a half of liniment wasted in the residuum.

The chief thing to be now ascertained was, whether the process of the Pharmacopœia is injurious to the qualities of the aconite. The only way to ascertain this is by the application of the liniment on a sensitive part of the body, and by comparing its effects with those of another liniment similarly made with aconite roots recently taken from the ground, and neither dried nor heated.

It being just the period of the year (late in May) when the roots are in best condition, I procured some fresh from the garden. They were sliced, immediately thrown into the proper quantity of rectified spirit, and allowed to macerate for twenty-four hours.

A piece of lint soaked in this tincture or liniment was laid on my forehead, and left closely adhering for an hour and a half, being during that period saturated with the liniment four times. My first impression was that of cold, which soon after so far changed that it was difficult to determine whether it was cold or heat; but it soon became very decidedly heat, and after a while it increased to smarting, and very painful smarting it was. Meanwhile, I felt tightness of the skin, and pressure resembling a band drawn tight over the forehead. Then came on a kind of vibration and creeping of the part, and although the smarting continued, the part when touched had but little feeling. After an hour and a half, the smarting began to abate, but the tightness and vibration continued for three hours, and even next morning were perceptible. The forehead was much reddened.

A lady, a member of my family, aware of what I was doing, submitted to the same experiment. She describes the sensation of great heat or cold—doubtful which—the very painful smarting, which continued an hour and a half after the application had been removed, and the want of feeling, notwithstanding, when the part was touched. She also felt the tension and pressure. The forehead was very much reddened, and somewhat the next day.

The effects of the recent aconite root were thus decisive and striking. The next object was to ascertain the effects of the pharmacopœial preparation. With this view I applied lint soaked in the liniment (without the camphor) to my forehead, and conducted the experiment as before. After some time a slight sense of coldness and tightness was perceptible, which soon passed off; a partial and transitory tickling (not tingling) ensued. There was no smarting whatever, nor heat; but the forehead was slightly reddened.

The lady already mentioned applied the pharmacopœial preparation in the same manner as before. She describes the sensation as doubtful whether hot or cold; but whatever it was, as much less in degree than in her former trial. There was neither tightness nor pressure, and during an hour and a half, although the wetting of the lint was renewed three times, the smarting was "not worth speaking of." It is to be observed that the application was continued three times longer than in the former case, although the effect was so much weaker. A slight sensation of coldness remained for several hours, and was at length accompanied by slight tightness of the skin. On the whole, the effects were much less decided than in the former case, yet this lady was particularly sensitive to the influence of aconite. She had formerly been troubled with brow-ache. It was her habit to go into the garden, and having pulled a handful of aconite leaves, to wet them slightly, and after rubbing between her hands, to apply them to her forehead. The effects were coldness, some smarting, and an indescribable vibratory creeping in the part; altogether the sensations were so disagreeable, and the relief so small, that she discontinued the practice.

It is to be observed that the recent roots were macerated for twenty-four hours only; but the powder of the dry roots had been macerated for seven days, as directed in the Pharmacopœia. In none of the trials had the camphor been as yet added to the liniment.

These facts left no doubt in my mind that the Linimentum Aconiti of the British Pharmacopœia is by no means what it might have been, had the recent root been employed. Beside the superior power of the liniment thus prepared, there would have been other advantages. The trouble and loss caused by drying and powdering, which are considerable, would have been avoided by the more simple process of slicing the root. The ratio of the root to the rectified spirit might have been much less, and the loss of liniment, by permanent absorption, saved; for the root would give out as much juice as it absorbed spirit. Much time would also have been saved, for twenty-four hours' maceration produced a more powerful liniment than seven days with the dried powder, and the cost would be considerably less.

Seeing that nearly two hours' continued application of the liniment was necessary to produce the full effect, it may be doubted that merely rubbing it for a few minutes in the usual way to any part of the body can produce much benefit.

The specific gravity of the liniment before the camphor was added was ·878.

I also made a liniment of the leaves of aconite, and applied a portion to my forehead in the manner already described. It produced smarting and coldness, but both in a much less degree than the liniment made from the roots.

In order to discover if the rectified spirit acted any considerable part in the smarting, I applied it on lint to my forehead several times during two hours, but found very little effect from it.—*Dublin Medical Press.*

11, *Clare Street.*

ON ACONITIA AND ITS PHYSIOLOGICAL EFFECTS.

BY M. ERNEST HOTTOT.

In a former paper the author, in connection with M. Liegeois, has published some results. In the present paper, which is extracted from a thesis sustained before the Académie de Médecine by M. Hottot alone, the author has entered more fully into the subject, both as regards its preparation and physiological effects. The following method of preparing aconitia was adopted :—

Macerate the aconite root in powder in a sufficient quantity of alcohol of 85° during eight days. Displace the liquors, distil in a water-bath, add a sufficient quantity of quick-lime, agitate from time to time, filter, precipitate by a slight excess of diluted sulphuric acid, and evaporate to the consistence of syrup. Add to this liquid two or three times its weight of water, allow it to repose, and remove the green oil which floats and solidifies at 68° F., strain through a moistened filter to remove the last portions of oil; treat by ammonia in excess, and heat to ebullition; the aconitia is precipitated as a compact mass, which contains a great deal of resin, and separates easily from the liquor; wash the precipitate, treat it when dry by ether deprived of water and alcohol, and permit the ethereal liquor to evaporate spontaneously, which gives impure aconitia.

Dissolve the product thus obtained in diluted sulphuric acid, and precipitate it hot by ammonia ; the aconitia separates in the form of a coagulum like codeia. Collect it on a filter, wash and dry it, dissolve in ether, evaporate to dryness, again dissolve in a small quantity of diluted sulphuric acid, and finally precipitate the aconitia by the addition, drop by drop, of an excess of ammonia; wash it, and dry at a low temperature.

Ten kilogrammes (22 lbs. av.) of the root of aconitum napellus in good order, gave a mean of four to six grammes (61 to 92 grains) of alkaloid.

Aconitia thus obtained presents the form of a white powder, extremely light, of a bitter taste : it is in the state of hydrate, and contains 20 per cent. of water; at 187° F. it melts and becomes anhydrous, and is then a transparent amber-coloured substance. Although the aconitia of M. Hottot has only been obtained in an amorphous state, it is very much more active than the aconitias of commerce, which are generally very impure, although they are often crystallized.

A singular thing, and well worthy of attention, is, that there exists in aconite root two distinct substances, which possess, in different degrees, the physiological properties of this substance. One is the amorphous aconitia of M. Hottot, the other is a substance which is presented in the form of well-defined crystals, and which after three successive crystallizations and evidently chemically pure, determined the same symptoms as amorphous aconitia, though in a much weaker degree. What is the nature of this substance which has been obtained by Mr. Morson, and for which he proposes the name of napellina ? Is it a transformation of aconitia, or a co-existent body ? Whatever it be, M. Hottot has studied aconitia, which presents the following properties :—

Aconitia blues reddened litmus paper, saturates acids, and forms salts which do not crystallize. It is a nitrogenous alkaloid, of which the composition, according to M. Stahlschmidt, is represented by $C_{60}H_{17}O_{11}N$. Treated hot by SO_3,HO, it is coloured first yellow, and afterwards violet-red; tannin precipitates it abundantly, ioduretted iodide of potassium a kermes-coloured precipitate, and this reagent is its best antidote. Iodohydrargyrate of potassium gives a curdy yellowish-white precipitate; chloride of gold, yellow, and with chloride of platinum no precipitate.

M. Hottot employs aconitia in the form of pills, each containing the fifth of a milligramme ($\frac{1}{325}$th grain), or in the form of tincture $\frac{1}{16}$th of a grain to the drachm. The dose of the pills is from two to ten per day, and of the tincture ten to forty drops.

The author has arrived at the following conclusions as to the physiological action of aconitia :—

The root of aconite only should be used for making the preparations of aconite.

Aconitia has the same physiological properties as the root. The irritant properties of aconite, usually attributed to an acrid principle, belongs to aconitia. Its action is exercised on the mucous membranes.

The absorption of aconitia by the intestinal canal is more rapid than is that of curara and strychnia by the same tissue, and this explains the rapidity of the death of animals to which even small doses of aconitia have been given.

Aconitia acts on the nervous centres, and successively on the bulb, the spinal marrow, and the brain.

The symptoms manifest themselves in the following order:—suspension of respiration, of general sensibility, of reflex sensibility, and of voluntary movements.

Aconitia disturbs the functions of the heart by acting on its nervous tissues.

The effects of aconitia on men are the following:—irritation of the mucous membranes, salivation, nausea, muscular weakness, prickling, sweats, heaviness of the head, pain in the track of the facial nerves, dilatations of the pupils, slow respiration, depression of the pulse, and weakness of sensibility.

Aconitia is a powerful sedative; in external forms it has been applied with success in calming neuralgic and rheumatic pain, internally it may be given from $\frac{1}{130}$th to $\frac{1}{32}$nd of a grain, the maximum dose.

In conclusion, M. Hottot cautions physicians and pharmaceutists in relation to the variable nature or power of commercial aconitia as made by different processes.—*Amer. Journ. Pharm.* from *Journal de Pharmacie, April*, 1864.

ON *MYROXYLON TOLUIFERUM*, AND THE MODE OF PROCURING THE BALSAM OF TOLU.

BY JOHN WEIR.

Extracted from the Proceedings of the Royal Horticultural Society for May, 1864.

[Previous to his departure for New Granada, Mr. Weir received instructions to make inquiries respecting certain interesting medicinal plants growing in that country, especially the *Balsam of Tolu* tree and *Sarsaparilla*, and to obtain, if possible, seeds and specimens. In accordance with these instructions, Mr. Weir has communicated the following interesting notice of his proceedings.]

From inquiries made during the voyage out, and immediately on landing in this country, I learnt that a good deal of the Balsam of Tolu was brought down the river Magdalena annually to Barranquilla, whence it is exported to Europe. I therefore thought that the best way of reaching the country where the tree grows, was to go up the river to one of the ports I was informed the drug came from, where I hoped to be able to procure specimens and collect the desired information concerning it. At all events, I was told that by going to one of the ports on the lower Magdalena, I could cross the country to the valley of the Zinú quite as easily as I could reach the mouth of that river from Cartagena by sea.

Following up this plan, I took a passage to Mompox by the first steamer up the river after my arrival at Barranquilla. On arriving at Mompox, I found that no balsam was gathered there (although I had been assured to the contrary in Barranquilla), and that the people generally did not know the tree; a negro was recommended to me, however, as having a wonderful knowledge of all kinds of "*hervas y remedios*," and who said he knew where some of the balsam-trees grew. With this man I started in a canoe for a place called Espiño, about three leagues distant from Mompox, and situated on the margin of one of the large swamps called "*ceinigas*," so common on the lower part of the river.

On reaching this place we entered the forest; and after having toiled through it for a couple of hours, during which I was gradually losing faith in the probity of my guide, he suddenly pointed out a tree which he assured me was the balsam-tree. This confirmed the opinion I had been forming—that he knew nothing about it, for the tree was certainly not a *Myroxylon*, nor anything like one.

I returned to Mompox in disgust. The gentleman who recommended the black was much disappointed on learning the result of our excursion, but said he had found another man, who would undertake to guide me to a place where the tree was to be found. I went with him a few days afterwards, but with no better success.

I have no doubt that the tree occurs within perhaps a day's journey of Mompox, but not in its immediate vicinity; for the ground, for leagues around that place, is low and swampy; indeed it was nearly all under water when I arrived there, and I afterwards found that the tree is never found in the low tracks adjoining the river, but in the higher rolling ground beyond, where the soil is dry.

Finding that the tree was not known in Mompox, I left for Plato on the 17th December. Taking the steamer to Las Mercedes, I went from thence to Plato in a canoe. Las Mercedes is the port of El Carmen, and it consists only of a large storehouse for the tobacco brought from the interior, and the imported goods received in exchange. It was here I first saw the balsam. In the store were upwards of thirty tins full of it, ready for exportation; most of the tins contained ten pounds of the balsam, but there were also a few of a larger size, each containing an arroba of twenty-five pounds. The store-keeper told me that that lot of balsam had come from Plato only a day or two before, and that he expected some more that evening from the same place. The drug, he further informed me, was also exported from Teneriffe, Pinto, and Santa Anna, all small ports on the right bank of the river, but that most came from Plato. At Corozal, he said, none was now gathered, although the tree exists there, as also at El Carmen.

I was glad to find that I had got on the right track at last, and waited patiently for the canoe from Plato, by which I hoped to get a passage to that place. It arrived about six o'clock in the evening, started on its return an hour later, and by nine of the same day that I left Mompox, we were in Plato. This place is about a league further down the river than Las Mercedes, and on its opposite side, near the outlet of one of the numerous branch-streams the river forms in its course. Luckily for me, the "Jefe Municipale" of Plato, Frederico Alfaro by name, came in the canoe with me, and this man showed me much disinterested kindness during my stay there.

I had great difficulty in getting animals for the journey into the Montaña,—not a horse nor a mule was to be had, and it was only after waiting two days that I was able to hire two donkeys, one for my guide and the other for myself; a third for baggage I could not get,—and indeed it was considered quite unnecessary, as it is the usual custom here to travel on donkeys loaded with 80 or 90 lbs. of cargo besides the rider.

During the two days I had to wait at Plato, I found a species of *Myrospermum* growing plentifully in the neighbourhood of the village, and gathered specimens of it both in flower and fruit. This I take to be *M. frutescens*, Jacq.: it grows to a height of about 15 to 20 feet. Some trees are now in flower, while on others the fruit is already of a good size. The trees bearing flowers or fruit are generally destitute of foliage, and it is only barren individuals that are in full leaf.

On the morning of the 21st, having got the donkeys and guide assembled and everything ready, we started for the Montaña. On one side of my own donkey was hung a bundle of paper and boards for drying specimens, and on the other my "estéra" (mat for sleeping on), blankets, mosquito net, and a change of clothes; that of the guide carried some provisions for the journey and his own things. I started on foot, feeling almost ashamed to mount an animal not much bigger than myself which seemed to be already well loaded, but, before the day's journey was done, I had been glad to take occasional lifts on the poor donkey. We made about eighteen miles before we halted for the night, and my guide, a man twice my weight, rode every foot of the way. What with the burning sun, the thermometer at 89° in the shade, and the heavy load, I did not much envy his poor "burro."

We passed some balsam-trees in the afternoon, each with a lot of calabashes stuck on its trunk to catch the drug which trickled from the wounds in its bark. I picked up a few of the fruit under one of these trees, and on asking him what they were, he said they were "ojos de algo palo de la montaña." He did not know them, although he told me he had been accustomed to gather balsam since his boyhood.

Our second day's journey was not so long as the first,—I think not more than about twelve miles. The balsam-trees occurred occasionally during the whole way. We stopped at a hut in the forest surrounded by a small clearing, the owner of which, like all the inhabitants of the Montaña, makes part of his living by gathering balsam. The trees were very plentiful here, and generally of a large size. Their average height is about 70 feet, and the trunk is sometimes upwards of 2 feet in diameter a yard from the ground, and generally rises to a height of 40 feet without branching, so that it is impossible to get at either foliage or fruit without cutting down the tree. On the day after our arrival, I got the man's permission to have a tree felled; he did not charge me anything for the tree, but stipulated that I should pay two of his sons a dollar each for felling it. I selected an old tree, nearly 2 feet in diameter. There was a sprinkling of pods upon it, but it was not by any means loaded. The pods are so loosely attached to the branches and so brittle in themselves, that nearly all of them were shaken from the tree and many broken to pieces by the shock of the fall. I found them to be approaching maturity, the seeds being fully developed, but, I am afraid, not ripe enough to grow. I had another smaller and more vigorous tree cut; the foliage of this was much larger than that of the older tree, and also a little different in form, but it bore no fruit. The specimens I send will sufficiently show the difference in the foliage of the two trees, and it is also sufficiently explained by the greater luxuriance of the younger.

As I have already said, it is impossible to reach the foliage of any of the trees unless by felling them; but I examined the leaflets of many trees from specimens picked up from the ground, but saw nothing to induce me to believe that the balsam is produced here by more than one species. The young trees have always larger foliage than the old ones; but the difference was constantly the same as it was in the individuals I had felled. The trees never make a very dense head of branches and foliage; but in the old ones, which have been much bled, it is very thin: many of the small twigs are dead, and the living ones are covered with lichens.

When a tree is about to be bled, two sloping notches are made in its trunk quite through the bark, and meeting in a sharp angle at their lower ends, leaving thus a point of bark between them untouched. The bark and wood is hollowed out a little immediately under this point, and the calabash cup is inserted under it. The process is repeated all over the trunk at close intervals, up as high as a man can reach; I have seen as many as twenty cups on a tree. The piece of bark and the cups I have sent, will show the process better than I can describe it. When the lower part of the trunk of a tree is too full of scars and wounds for any fresh cuts to be made, a rude scaffold is sometimes made round the tree, and a new series of notches made higher up.

From time to time, as may be necessary, the balsam gatherer goes round the trees with a pair of flask-shaped bags made of raw hide, slung over the back of a donkey. Into these bags the contents of the calabash cups are successively poured, and the cups are re-inserted under the point of bark and left to be again filled. The balsam is sent down to the ports on the river in these hide bags, where it is transferred to the tins.

I could not learn which were the best months for the flowing of the balsam,—one person saying that it was in July, another in March, and so on, scarcely two agreeing; but the bleeding goes on during at least eight months of the year, from July to March or April. When the balsam is flowing well, I was told that "one moon" sufficed to fill the cups.

Respecting the time of the flowering of the tree, individuals differed as widely as they did about the best time for the production of the balsam. I think I was told that it flowered in every month of the year, each person asked giving a different month; and several asserted that it did not flower at all.

I could not get any one to recognize the name "*Balsamo de concolito.*" I tried individuals with it at Cartagena, Barranquilla, Mompox, Las Mercedes, Plato, and the Montaña, but none of them knew what I meant. The balsam is certainly not known by that name at any of these places, but is always called *Balsamo de Tolu.**

I remained a couple of days in the Montaña, and returned to Plato. We travelled part of the way with a man going down to the port with a quantity of balsam: he had three donkeys loaded with it, each carrying four arrobas, or 100 lbs. weight. The quantities of the drug I saw on its way for exportation at Las Mercedes, Plato, and on the road from the Montaña, must have amounted to at least 1500 lbs., which proves that the tree must be very plentifully scattered through the forest.

I returned to Mompox in a canoe, and arrived there on the 29th ult. On the 4th of the present month I left Mompox by the steamer up the river, and landed here on the 7th. This place is called Barranca Vermeija, and is situated on the river side, about two leagues further up than the place where the village of Bojorques formerly stood, for it is not now in existence, the river having carried all the houses away. This being the nearest point to Bojorques I could land at, I came here hoping to find *Smilax officinalis* H.B.K., but

* "The balsam is not distinguished in this region [Carthagena] by the name of *Tolu*, but is known by the name of *Balsamo de concolito,—concolito* being the native name of the small calabash used for collecting it."—*Letter from the late Sutton Hayes to D. Hanbury, April 23rd*, 1862.

after several days' unsuccessful searching for it, I am afraid I must conclude it is not here; but I will go to Bojorques in another day or two, and perhaps I may find it there.

The Rhatany, I was told at Barranquilla, came from the neighbourhood of Bucaramanga, and as I intend to go up the river Sogamoza to that place when I leave Bojorques, I hope to be able to procure specimens of the plant that produces it there.

Barranca Vermeija, on the River Magdalena, New Granada,
January 13*th*, 1864.

ON THE PROPERTIES OF SILICIC ACID AND OTHER ANALOGOUS COLLOIDAL SUBSTANCES.

BY THOMAS GRAHAM, F.R.S., MASTER OF THE MINT.

(*Preliminary Notice.*)

The prevalent notions respecting solubility have been derived chiefly from observations on crystalline salts, and are very imperfectly applicable to the class of colloidal substances. Hydrated silicic acid, for instance, when in the soluble condition, is properly speaking a liquid body, like alcohol, miscible with water in all proportions. We have no degrees of solubility to speak of with respect to silicic acid, like the degrees of solubility of a salt, unless it be with reference to silicic acid in the gelatinous condition, which is usually looked upon as destitute of solubility. The jelly of silicic acid may be more or less rich in combined water, as it is first prepared, and it appears to be soluble in proportion to the extent of its hydration. A jelly containing 1 per cent. of silicic acid, gives with cold water a solution containing about 1 of silicic acid in 5000 water; a jelly containing 5 per cent. of silicic acid, gives a solution containing about 1 part of acid in 10,000 water. A less hydrated jelly than the last mentioned is still less soluble; and finally, when the jelly is rendered anhydrous, it gives gummy-looking white masses, which appear to be absolutely insoluble, like the light dusty silicic acid obtained by drying a jelly charged with salts, in the ordinary analysis of a silicate.

The liquidity of silicic acid is only affected by a change, which is permanent (namely, coagulation or pectization), by which the acid is converted into the gelatinous or pectous form, and loses its miscibility with water. The liquidity is permanent in proportion to the degree of dilution of silicic acid, and appears to be favoured by a low temperature. It is opposed, on the contrary, by concentration, and by elevation of temperature. A liquid silicic acid of 10 or 12 per cent. pectizes spontaneously in a few hours at the ordinary temperature, and immediately when heated. A liquid of 5 per cent. may be preserved for five or six days; a liquid of 2 per cent. for two or three months; and a liquid of 1 per cent. has not pectized after two years. Dilute solutions of 0·1 per cent. or less are no doubt practically unalterable by time, and hence the possibility of soluble silicic acid existing in nature. I may add, however, that no solution, weak or strong, of silicic acid in water has shown any disposition to deposit *crystals*, but always appears on drying as a colloidal glassy hyalite. The formation of quartz crystals at a low temperature, of so frequent occurrence in nature, remains still a mystery. I can only imagine that such crystals are formed at an inconceivably slow rate, and from solutions of silicic acid which are extremely dilute. Dilution no doubt weakens the colloidal character of substances, and may therefore allow their crystallizing tendency to gain ground and develope itself, particularly where the crystal once formed is completely insoluble, as with quartz.

The pectization of liquid silicic acid is expedited by contact with solid matter in the form of powder. By contact with powdered graphite, which is chemically inactive, the pectization of a 5 per cent. silicic acid is brought about in an hour or two, and that of a 2 per cent. silicic acid in two days. A rise of temperature of 1°·1 C. was observed during the formation of the 5 per cent. jelly.

The ultimate pectization of silicic acid is preceded by a gradual thickening in the liquid itself. The flow of liquid colloids through a capillary tube is always slow compared with the flow of crystalloid solutions, so that a liquid-transpiration-tube may be employed as a colloidoscope. With a colloidal liquid alterable in viscosity, such as silicic acid, the increased resistance to passage through the colloidoscope is obvious from day to day. Just before gelatinizing, silicic acid flows like an oil.

A dominating quality of colloids is the tendency of their particles to adhere, aggregate, and contract. This idio-attraction is obvious in the gradual thickening of the liquid, and when it advances leads to pectization. In the jelly itself, the specific contraction in question, or *synæresis*, still proceeds, causing separation of water, with the division into a clot and serum; and ending in the production of a hard stony mass, of vitreous structure, which may be anhydrous, or nearly so, when the water is allowed to escape by evaporation. The intense synæresis of isinglass dried in a glass dish over sulphuric acid *in vacuo*, enables the contracting gelatin to tear up the surface of the glass. Glass itself is a colloid, and the adhesion of colloid to colloid appears to be more powerful than that of colloid to crystalloid. The gelatin, when dried in the manner described upon plates of calcspar and mica, did not adhere to the crystalline surface, but detached itself on drying. Polished plates of glass must not be left in contact, as is well known, owing to the risk of permanent adhesion between their surfaces. The adhesion of broken masses of glacial phosphoric acid to each other is an old illustration of colloidal synæresis.

Bearing in mind that the colloidal phasis of matter is the result of a peculiar attraction and aggregation of molecules, properties never entirely absent from matter but greatly more developed in some substances than in others, it is not surprising that colloidal characters spread on both sides into the liquid and solid conditions. These characters appear in the viscidity of liquids, and in the softness and adhesiveness of certain crystalline substances. Metaphosphate of soda, after fusion by heat, is a true glass or colloid; but when this glass is maintained for a few minutes at a temperature some degrees under its point of fusion, the glass assumes a crystalline structure without losing its transparency. Notwithstanding this change, the low diffusibility of the salt is preserved, with other characters of a colloid. Water in the form of ice has already been represented as a similar intermediate form, both colloid and crystalline, and in the first character adhesive and capable of reunion or "regelation."

It is unnecessary to return here to the fact of the ready pectization of liquid silicic acid by alkaline salts, including some of very sparing solubility, such as carbonate of lime, beyond stating that the presence of carbonate of lime in water was observed to be incompatible with the coexistence of soluble silicic acid, till the proportion of the latter was reduced to nearly 1 in 10,000 water.

Certain liquid substances differ from the salts in exercising little or no pectizing influence upon liquid silicic acid. But, on the other hand, none of the liquids now referred to appear to conduce to the preservation of the fluidity of the colloid, at least not more than the addition of water would do. Among these inactive diluents of silicic acid are found hydrochloric, nitric, acetic, and tartaric acids, syrup of sugar, glycerine, and alcohol. But all the liquid substances named, and many others, appear to possess an important relation to silicic acid, of a very different nature from the pectizing action of salts. They are capable of displacing the combined water of the silicic acid hydrate, whether that hydrate is in the liquid or gelatinous condition, and give new substitution-products.

A liquid compound of *alcohol* and silicic acid is obtained by adding alcohol to aqueous silicic acid, and then employing proper means to withdraw the water from the mixture. For that purpose the mixture contained in a cup may be placed over dry carbonate of potash or quicklime, within the receiver of an air-pump. Or a dialysing bag of parchment-paper containing the mixed alcohol and silicic acid may be suspended in a jar of alcohol: the water diffuses away, leaving in the bag a liquid composed of alcohol and silicic acid only. A point to be attended to is, that the silicic acid should never be allowed to form more than 1 per cent. of the alcoholic solution, otherwise it may gelatinize during the experiment. If I may be allowed to distinguish the liquid and gelatinous hydrates of silicic acid by the irregularly formed terms of *hydrosol* and *hydrogel* of silicic acid, the two corresponding alcoholic bodies now introduced may be named the alcosol and alcogel of silicic acid.

The *alcosol* of silicic acid, containing 1 per cent. of the latter, is a colourless liquid, not precipitated by water or salts, nor by contact with insoluble powders, probably from the small proportion of silicic acid present in solution. It may be boiled and evaporated without change, but is gelatinized by a slight concentration. The alcohol is retained less strongly in the alcosol of silicic acid than water is in the hydrosol, but with the same varying force, a small portion of the alcohol being held so strongly as to char when the resulting jelly is rapidly distilled at a high temperature. Not a trace of silicic ether is found in any compound of this class. The jelly burns readily in the air, leaving the whole silicic acid in the form of a white ash.

The *alcogel*, or solid compound, is readily prepared by placing masses of gelatinous silicic acid, containing 8 or 10 per cent. of the dry acid, in absolute alcohol, and changing the latter repeatedly till the water of the hydrogel is fully replaced by alcohol. The alcogel is generally slightly opalescent, and is similar in aspect to the hydrogel, preserving very nearly its original bulk. The following is the composition of an alcogel carefully prepared from a hydrogel which contained 9·35 per cent. of silicic acid:—

Alcohol	88·13
Water	0·23
Silicic acid	11·64
	100·00

Placed in water, the alcogel is gradually decomposed—alcohol diffusing out and water entering instead, so that a hydrogel is reproduced.

Further, the alcogel may be made the starting-point in the formation of a great variety of other substitution jellies of analogous constitution, the only condition required appearing to be that the new liquid and alcohol should be intermiscible, that is, inter-diffusible bodies. Compounds of ether, benzole, and bisulphide of carbon have thus been produced. Again, from *etherogel* another series of silicic-acid jellies may be derived, containing fluids soluble in ether, such as the fixed oils.

The preparation of the *glycerine* compound of silicic acid is facilitated by the comparative fixity of that liquid. When hydrated silicic acid is first steeped in glycerine, and then boiled in the same liquid, water distils over, without any change in the appearance of the jelly, except that when formerly opalescent it becomes now entirely colourless, and ceases to be visible when covered by the liquid. But a portion of the silicic acid is dissolved, and a *glycerosol* is produced at the same time as the glycerine jelly. A glycerogel prepared from a hydrate containing 9·35 per cent. of silicic acid, was found by a combustion analysis to be composed of

Glycerine	87·44
Water	3·78
Silicic acid	8·95
	100·17

The glycerogel has somewhat less bulk than the original hydrogel. When a glycerine jelly is distilled by heat, it does not fuse, but the whole of the glycerine comes over, with a slight amount of decomposition towards the end of the process.

The compound of sulphuric acid, *sulphagel*, is also interesting from the facility of its formation, and the complete manner in which the water of the original hydrogel is removed. A mass of hydrated silicic acid may be preserved unbroken if it is first placed in sulphuric acid diluted with two or three volumes of water, and then transferred gradually to stronger acids, till at last it is placed in concentrated oil of vitriol. The sulphagel sinks in the latter fluid, and may be distilled with an excess of it for hours without losing its transparency or gelatinous character. It is always somewhat less in bulk than the primary hydrogel, but not more, to the eye, than one-fifth or one-sixth part of the original volume. This sulphagel is transparent and colourless. When a sulphagel is heated strongly in an open vessel, the last portions of the monohydrated sulphuric acid in combination are found to require a higher temperature for their expulsion than the boiling-point of the acid. The whole silicic acid remains behind, forming a white, opaque, porous mass, like pumice. A sulphagel placed in water is soon decomposed, and the original hydrogel reproduced. No permanent compound of sulphuric and silicic acids, of the nature of a salt, appears to be formed in any circumstances. A sulphagel placed in alcohol gives ultimately a pure alcogel. Similar jellies of silicic acid may readily be formed with the monohydrates of nitric, acetic, and formic acids, and are all perfectly transparent.

The production of the compounds of silicic acid now described indicates the possession of a wider range of affinity by a colloid than could well be anticipated. The organic colloids are no doubt invested with similar wide powers of combination, which may become of interest to the physiologist. The capacity of a mass of gelatinous silicic acid to assume alcohol, or even oleine, in the place of water of combination, without disintegration or alteration of form, may perhaps afford a clue to the penetration of the albuminous matter of membrane by fatty and other insoluble bodies, which seems to occur in the digestion of food. Still more remarkable and suggestive are the *fluid* compounds of silicic acid. The fluid alcohol-compound favours the possibility of the existence of a compound of the colloid albumen with oleine, soluble also and capable of circulating with the blood.

The feebleness of the force which holds together two substances belonging to different physical classes, one being a colloid and the other a crystalloid, is a subject deserving notice. When such a compound is placed in a fluid, the superior diffusive energy of the crystalloid may cause its separation from the colloid. Thus, of hydrated silicic acid, the combined water (a crystalloid) leaves the acid (a colloid) to diffuse into alcohol; and if the alcohol be repeatedly changed, the entire water is thus removed, alcohol (another crystalloid) at the same time taking the place of water in combination with the silicic acid. The liquid in excess (here the alcohol) gains entire possession of the silicic acid. The process is reversed if an alcogel be placed in a considerable volume of water. Then alcohol separates from combination, in consequence of the opportunity it possesses to diffuse into water; and water, which is now the liquid present in excess, recovers possession of the silicic acid. Such changes illustrate the predominating influence of mass.

Even the compounds of silicic acid with alkalies yield to the decomposing force of diffusion. The compound of silicic acid with 1 or 2 per cent. of soda is a colloidal solution, and, when placed in a dialyser over water *in vacuo* to exclude carbonic acid, suffers gradual decomposition. The soda diffuses off slowly in the caustic state, and gives the usual brown oxide of silver when tested with the nitrate of that base.

The pectization of liquid silicic acid and many other liquid colloids is effected by contact with minute quantities of salts in a way which is not understood. On the other hand, the gelatinous acid may again be liquefied and have its energy restored by contact with a very moderate amount of alkali. The latter change is gradual, 1 part of caustic soda, dissolved in 10,000 water, liquefying 200 parts of silicic acid (estimated dry) in 60 minutes at 100° C. Gelatinous stannic acid also is easily liquefied by a small proportion of alkali, even at the ordinary temperature. The alkali, too, after liquefying the gelatinous colloid, may be separated again from it by diffusion into water upon a dialyser. The solution of these colloids, in such circumstances, may be looked upon as analogous to the solution of insoluble organic colloids witnessed in animal digestion, with the difference that the solvent fluid here is not acid but alkaline. Liquid silicic acid may be represented as the "peptone" of gelatinous silicic acid; and the liquefaction of the latter by a trace of alkali may be spoken of as the peptization of the jelly. The pure jellies of alumina, peroxide of iron, and titanic acid, prepared by dialysis, are assimilated more closely to albumen, being peptized by minute quantities of hydrochloric acid.

Liquid Stannic and Metastannic Acids.—Liquid stannic acid is prepared by dialysing the bichloride of tin with an addition of alkali, or by dialysing the stannate of soda with an addition of hydrochloric acid. In both cases a jelly is first formed on the dialyser; but, as the salts diffuse away, the jelly is again peptized by the small proportion of free alkali remaining: the alkali itself may be removed by continued diffusion, a drop or two of the tincture of iodine facilitating the separation. The liquid stannic acid is converted on heating it into liquid metastannic acid. Both liquid acids are remarkable for the facility with which they are pectized by a minute addition of hydrochloric acid, as well as by salts.

Liquid Titanic Acid is prepared by dissolving gelatinous titanic acid in a small quantity of hydrochloric acid, without heat, and placing the liquid upon a dialyser for several days. The liquid must not contain more than 1 per cent. of titanic acid, otherwise it spontaneously gelatinizes, but it appears more stable when dilute. Both titanic and the two stannic acids afford the same classes of compounds with alcohol, etc., as are obtained with silicic acid.

Liquid Tungstic Acid.—The obscurity which has so long hung over tungstic acid is removed by a dialytic examination. It is in fact a remarkable colloid, of which the pectous form alone has hitherto been known. Liquid tungstic acid is prepared by adding dilute hydrochloric acid carefully to a 5 per cent. solution of tungstate of soda, in sufficient proportion to neutralize the alkali, and then placing the resulting liquid on a dialyser. In about three days the acid is found pure, with the loss of about 20 per cent., the salts having diffused entirely away. It is remarkable that the *purified* acid is not pectized by acids or salts even at the boiling temperature. Evaporated to dryness, it forms vitreous scales, like gum or gelatin, which sometimes adhere so strongly to the surface of the evaporating dish as to detach portions of it. It may be heated to 200° C. without losing its solubility or passing into the pectous state, but at a temperature near redness it undergoes a molecular change, losing at the same time 2·42 per cent. of water. When water is added to unchanged tungstic acid, it becomes pasty and adhesive, like gum ; and it forms a liquid with about one-fourth its weight of water, which is so dense as to float glass. The solution effervesces with carbonate of soda, and tungstic acid is evidently associated with silicic and molybdic acids. The taste of tungstic acid dissolved in water is not metallic or acid, but rather bitter and astringent. Solutions of tungstic acid containing 5, 20, 50, 66·5, and 79·8 per cent. of dry acid, possess the following densities at 19° :—1·0475, 1·2168, 1·8001, 2·396, and 3·243. Evaporated *in vacuo* liquid tungstic acid is colourless, but becomes green in air from the deoxidating action of organic matter. Liquid silicic acid is protected from pectizing when mixed with tungstic acid ; a circumstance probably connected with the formation of the double compounds of these acids which M. Marignac has lately described.

Molybdic Acid has hitherto been known (like tungstic acid) only in the insoluble form. Crystallized molybdate of soda dissolved in water is decomposed by the addition of hydrochloric acid in excess without any immediate precipitation. The acid liquid is thrown upon a dialyser and more hydrochloric acid occasionally added to it. After a diffusion of three days, about 60 per cent. of the molybdic acid remains behind in a pure condition. The solution of pure molybdic acid is yellow, astringent to the taste, acid to test-paper, effervesces with carbonates, and possesses much stability. Soluble molybdic acid, when dry, has the same gummy aspect as soluble tungstic acid, and absorbs moisture if exposed to damp air. Both acids lose their colloidality when combined with soda, and give a variety of crystallizable salts.

LIGHTHOUSE ILLUMINATION BY MAGNETO-ELECTRICITY.

BY J. H. GLADSTONE, ESQ., PH.D., F.R.S.

Any one who, on a tolerably clear night, has crossed the Channel between Folkestone and Boulogne, and remained on deck, must have noticed on the French coast what appeared a brilliant star, now waxing, now waning. It was the light of the far-famed Pharos, on Cape Grisnez. But if he has made the passage within the last eighteen months, his gaze will have been attracted by a still brighter star on the British coast, of a bluish tint, steady and brilliant. This is the Magneto-electric Light at Dungeness, the brightest spark in the world, and one which unites a rare scientific with a practical interest, and may prove only the first lighted of a multitude of similar beacons. I propose to say a few words on the history, production, and merits of this light.

History.—If we ask the parentage of the Magneto-electric Light, Mr. Frederick Hales Holmes is certainly its father, but, like other beings, it has had two grandfathers—the philosopher who first showed the conducting power of charcoal, and the brilliancy of the light between charcoal terminals of an interrupted galvanic current ; and Professor Faraday, who discovered that when a piece of soft iron, surrounded by a coil of metallic wire, was made to pass by the poles of a magnet, an electric current was produced in the wire, which revealed its existence by effecting chemical decompositions, or by giving a spark. This spark, it is true, was barely visible as at first obtained, but it has been exalted into the present Magneto-electric Light.

It appears that in 1853 some large magneto-electric machines were erected in Paris for producing gas by the decomposition of water, the object of the proprietor being to use this gas for the purposes of combustion ; but the scheme failed, the Company that was being formed came to nothing, and the machines were pronounced by leading scientific men to be only expensive toys. Mr. Holmes, however, who was one of the referees, proposed to turn them to account for electro-plating and gilding, and thought it possible that the Electric Light might be produced advantageously by their means. "My propositions," he says, in his evidence before the Royal Commission on Lights, Buoys, and Beacons, "were entirely ridiculed, and the consequence was, that instead of saying that I thought I could do it, I promised to do it by a certain day. On that day, with one of Duboscq's regulators or lamps, I produced the Magneto-electric Light for the first time; but as the machines were ill-constructed for the purpose, and as I had considerable difficulty to make even a temporary adjustment to produce a fitting current, the light could only be exhibited for a few minutes at a time—say ten or twenty minutes—when the adjustments were entirely displaced by the friction: the rubbing surfaces were worn away. From this time I directed my attention more particularly to the reconstruction of the machines entirely, from the very framework upwards, so as to produce the current that I saw necessary for the Electric Light." During this time, it appears that Mr. Holmes, not liking the treatment he received from the French Company, left Paris, and left his imperfect machine there; and it was this very machine which was subsequently used by the French Government in their experiments, and these experiments were carried on by a man who had worked under Mr. Holmes. The inventor next appears in Belgium, continuing his improvements with a new machine, and visited by Admiral (then Captain) Fitzroy, who was commissioned by the Admiralty to go to Brussels, see the light, and report on it. In February, 1857, Professor Holmes applied to the Trinity Board, and in the following month the Electric Light was exhibited, for several nights, at the experimental lantern* at Blackwall, before the Light Committee and Professor Faraday. In May, an agreement was made for a trial at the South Foreland; but it was not till the 8th of December that this experiment at an actual lighthouse was commenced. The Elder Brethren made arrangements for getting observations by the crews of pilot-cutters, masters of light vessels, and the keepers of neighbouring lighthouses, both on the British and French coasts. Some unforeseen difficulties seem to have arisen, due partly, no doubt, to the novelty of the whole arrangement, but partly also to the complicated optical apparatus in the lighthouse being suited to a large flame instead of a brilliant point of light, and being ill-adjusted to throw that light to the horizon. All this caused some interruptions in the experiment. M. Reynaud, the Director-General of the French Lighthouses, inspected the light on April 26, 1859; it was visited by most of the Members of the Royal Commission of Lights, Buoys, and Beacons, including myself, three days afterwards, and on the same day Professor Faraday wrote a Report to the Trinity House. The opinions expressed were so far favourable, that the Elder Brethren desired a further trial of six months, during which time the light was to be entirely under their own control, Mr. Holmes not being allowed to interfere in any way. The light was again kindled on August 22, and the experiment happened soon to be exposed to a severe test, as one of the Light-keepers, who had been accustomed to the arrangement of the lamps in the lantern, was suddenly removed, and another took his place without any previous instruction. This man thought the light quite strong enough if he allowed the carbon points to touch, as the lamp then required no attendance whatever, and he could leave it in that way for hours together. On being remonstrated with, he said, "It is quite good enough." Notwithstanding such difficulties as these, the experiment was considered satisfactory, but it was discontinued at the South Foreland, for the cliffs there are marked by a double light, and the electric spark was so much brighter than the oil-flames in the other house that there was no small danger of its being seen alone in thick weather, and thus fatally misleading some unfortunate vessel.

Then occurred a period of two years, consumed partly in coming to the decision that the Magno-electric Light was to be exhibited at Dungeness, and partly in fitting up the lighthouse there (which, by the way, had been cracked by lightning) for the reception of its new occupant.

It was not deemed desirable to trust the illumination of that headland entirely to the Electric Light, hence the old apparatus was retained, and the oil-lamp has always been kept ready for use in case of necessity. A supplementary lantern was therefore constructed on the top of the ordinary one, and in this the electric lamp was fixed, and surrounded by a small combination of lenses and prisms made expressly for it by Messrs. Chance, of Birmingham. In the meantime Mr. Holmes had considerably improved his lamp by borrowing an idea from an arrangement devised by a M. Serrin. At length, in

* The room with glass sides, from which the light is exhibited at the top of a lighthouse, is called a "lantern."

February, 1862, this lamp was lit at Dungeness, but it was extinguished on account of the necessity of instructing fresh lighthouse keepers, who had to take charge of the apparatus, and it was not till the 6th of June that the brilliant star shone permanently on our southern coast.

In the meantime, the French have not been indifferent or idle. When the Royal Commission visited Paris, the Lighthouse authorities were found experimenting with a comparatively small machine, and had clearly not overcome the difficulty of maintaining the charcoal points at a proper distance. But they persevered, and last July there was published in the 'Moniteur Universel' a Report by M. Reynaud to the Minister of Commerce and Public Works, in which he expressed a most favourable opinion of the Electric Light, and the Minister gave an order for two Electro-magnetic machines to be placed in the double Lighthouse of the Cap de la Hève, near Havre. Thus France is following England in the adoption of this improvement in coast lights, just as, years ago, Great Britain followed France in the use of the Dioptric system of illumination.

It is possible that some other nations may not be behind the French. The Dutch Government contemplate placing an Electric Light at Scheveningen, and a second one at Texel. The Lighthouse system in the empire of Brazil is excellent, and they have long had an eye on the Electric Light. Sweden is on the alert; and inquiries also have been made respecting its management and cost by the Imperial Academy of Vienna.

Apparatus.—Many readers will be familiar with the apparatus both of Mr. Holmes and of M. Berlioz, from having examined them at the International Exhibition last year. It would be very difficult to describe them without drawings, but the following may give a sufficiently good general idea. In the apparatus at Dungeness, the power that produces the light is resident in 120 permanent magnets, of about 50 lbs. each, ranged on the periphery of two large wheels. This power is called into action by a steam-engine, with Cornish boilers, of about three-horse power, which causes a series of 160 soft iron cores surrounded by coils of wire to rotate past the magnets. The small streams of electricity thus generated are collected together into one stream, and by a special piece of apparatus called a Commutator the alternate positive and negative currents are all brought into one direction. The whole power is then conveyed by a thick wire from the engine-house to the lighthouse tower, and up into the centre of the illuminating apparatus. There it passes between two charcoal points, producing thus a most brilliant and continuous spark. The "Lamp," or "Regulator," is so contrived that by means of a balance arrangement and a magnet, round which the wire coils, the charcoal points are kept always at a proper distance apart.

At sunset the machine is started, making about 100 revolutions per minute; and the attendant has only to draw two bolts in the lamp when the power thus spun in the engine-room bursts into light of full intensity. It now requires little or no thought for three hours and a half, when the charcoal points being consumed the lamp must be changed, and this is done without extinguishing the light, for it is the kindling of the second lamp that puts out the first. There are always several lamps ready at Dungeness in case of accident, and everything is kept in dnplicate.

The French machine is composed of 56 magnets distributed in 7 vertical equidistant planes, upon the angles of an octagonal prism. The maximum of intensity is obtained when the machines turns 350 or 400 times per minutes, and the direction of the current is then reversed nearly 6000 per minute. There is no Commutator employed, and the alternate currents are not brought into one.

Merits and Demerits.—In favour of the Electric apparatus, it may be stated without any fear of contradiction that the light is vastly more intense than that produced from the most powerful oil-lamp, or any practicable number of argand burners. In truth that now shining at Dungeness is the most brilliant light in existence. The following statement will illustrate this. Professor Faraday says of it, when at the South Foreland, "During the daytime I compared the intensity of the light with that of the sun, that is, it was placed before and by the side of the sun, and both looked at through dark glasses; its light was as bright as that of the sun, but the sun was not at its brightest." No other light in existence would have stood that test. Again, he describes an experiment at Dungeness:—"Arrangements were made on shore, by which observations could be made at sea about five miles off on the relative light of the Electric lamp, and the metallic reflectors with their argand oil-lamps—[the light formerly used]—for either could be shown alone, or both together. . . . The combined effect was a glorious light up to the five miles; then, if the Electric light was extinguished, there was a great falling off in the effect; though, after a few moments' rest to the eye, it was seen that the oil-lamps and reflectors were in their good and proper state. On the other hand, when the Electric light was restored, the glory rose to its first high condition. Then, whilst both were in action, the reflectors were shaded, and the Electric light left alone; but the naked eye could see no sensible *diminution;* nor when the reflectors were returned into effectual use, could it see any sensible *addition* to the whole light power, though the telescope showed that the alteration in the lantern had taken place at the right time." M. Reynaud estimates the usual intensity of the light at from 180 to 190 standard Carcel burners.

This superiority of brightness is of practical service only in thick weather, for if the air be clear an ordinary first-class light under the old system answers every purpose of the mariner, and in fog no light is of any avail; but it scarcely requires demonstration that in certain intermediate states of the atmosphere, the brighter light will penetrate the haze, rain, or snow to a distance at which the other is perfectly invisible. There is nothing in the nature of the rays emitted to prevent its doing so, for when submitted to spectral analysis, the Electric light is found to contain every ray that the oil-flame does, and others besides. The returns of neighbouring lighthouse keepers, and of the masters of two of the lightships at the Goodwin Sands, during the experiment at the South Foreland, show this to be actually the case, and similar testimony is borne by the masters of passing vessels, the commanders of the Channel Steam Packets, and the pilots who frequent the neighbouring seas.

The peculiar bluish colour of the light as seen from a distance is another advantage, by distinguishing it from ships' lights, or lamps on shore; and practically this is a great object. Of course, it may be made red or green, or any other tint, by coloured glasses; indeed, it is peculiarly adapted for such a purpose. As the light can be interrupted and immediately rekindled with full intensity at pleasure, this light offers facilities for signaling which no other does. Each lighthouse might be made to repeat its own number all night long, if that were thought desirable. Another advantage is well stated in the words of Professor Faraday:—"In cases where the light is from lamp-flames fed by oil, no increase of light at or near the focus or foci of the apparatus is possible beyond a certain degree, because of the size of the flames; but in the Electric lamp, any amount of the light may be accumulated at the focus, and sent abroad at, of course, an increased expense. In consequence of the evolution of the light in so limited a focal space, it may be directed seaward, diverging either more or less, or in a vertical or horizontal direction at pleasure, with the utmost facility. The enormous shadow under the light, produced by the oil-flame burner, which absorbs and renders useless the descending rays to a very large extent, does not occur in the Magneto-electric lamp; all the light proceeding in that direction is turned to account. The optical part of the arrangement, whether dioptric or reflecting, might be very small in comparison with those in use;" and, indeed, it is so at Dungeness. As there is always an extra steam-engine and machinery on the premises, and ready for work, the power, and the consequent light between the charcoal points, might at any time be doubled, if the state of the atmosphere seemed to require it.

It has already been remarked that in fog no light, however powerful, is of much avail, and public attention is now being directed to the necessity of improving our fog signals. It has been well observed in M. Reynaud's Report, "During foggy weather the supplementary steam-engine might be employed in playing sonorous instruments, which would carry sound to a much greater distance than the bells to which we have recourse at present."

Against the advantages attending the use of this Electric light must be set the greater complexity of the instrument, and the consequent greater chance of derangement, or rather the necessity of providing lighthouse-keepers of a superior order, and an engineer to inspect the machinery and keep it in repair. This demand for superior workmen is a difficulty we generally have to encounter in perfecting our engines either of peace or war.

The relative expense of the Magneto-electric light and the Fresnel lamp is a consideration that must not be overlooked, though it should not be allowed too much weight when we are dealing with the safety of valuable cargoes and priceless human lives. The original outlay in machinery for the Electric light is very large, but there must be set against this a considerable diminution in the cost of the apparatus used for directing the rays where they are wanted. The working expense consists of the coals burnt, the charcoal points used up, and the wear of the machinery, all of which perhaps scarcely exceeds the cost of oil under the old system. The magnets are said rather to increase in strength than to diminish by use. The salary of an engineer is a more serious item, but the expense may be greatly reduced by appointing one engineer to several lighthouses, if the electric system become common. Mr. Holmes estimates the working expenses of the electric apparatus as compared with the oil lamp, at about 400 against 290. The French estimate is, " Abstracting the expenses of the first establishment, it will be found that while the expenses of the annual maintenance of a lighthouse of the first order fed with colza oil rise to 9421 francs 75 centimes, those of the same lighthouse illuminated by electricity would be 12,240 francs." Again, "The annual expense will be increased 29 per cent. in lighthouses of the first order, but it will have the effect of rendering the luminous intensity at least fivefold greater."

It has been objected that the light is too bright, dazzling the mariner and misleading him as to its distance, but experience will soon remove this source of error; and it is hard to understand how the light can produce any dazzling effect, unless exhibited at the head of a pier close alongside of which the mariner must steer his way. But for harbour lights it is not required. Its proper place is on the prominent points of the coast which are used as landfalls by vessels, and unless objections present themselves in the future which are as yet unknown, we may confidently anticipate that each of these headlands will in time be marked by its brilliant electric light.—*Quarterly Journal of Science.*

ON THE CHEMICAL HISTORY AND APPLICATION OF GUN-COTTON.

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The history of gun-cotton affords an interesting illustration of the facility with which the full development of a discovery may be retarded, if not altogether arrested for a time, by hasty attempts to apply it to practical purposes, before its nature has been sufficiently studied and determined.

When Schönbein, in the autumn of 1846, announced that he had discovered a new explosive compound, which he believed would prove a substitute for gunpowder, the statement attracted general attention, and attempts were made with little delay in different countries to apply the material to purposes for which gunpowder hitherto had been alone used. Schönbein, and Bottger (who appears to have discovered gun-cotton independently, shortly after the former had produced it) lost little time in submitting their discovery to the German Confederation; and a committee was appointed for its investigation, by whom gun-cotton was eventually pronounced inapplicable as a substitute for gunpowder.

In this country, gun-cotton was experimented with immediately after the method of its preparation was published by Schönbein. Researches were instituted into its nature, preparation, etc., by Porrett and Teschemacher, John Taylor, Gladstone and others. A few experiments were made on its application as a propelling and mining agent, and the manufacture of the material upon a considerable scale was set on foot by Messrs. Hall, the well-known gunpowder makers at Faversham; a patent having been previously taken out in this country for the production of gun-cotton according to Schonbein's process. This factory had, however, not been long in operation before a very disastrous explosion occurred at the works, by which a number of men lost their lives, and which was ascribed to the spontaneous ignition of the gun-cotton, by the jury, who endeavoured to investigate its cause. From that time, the manufacture of gun-cotton upon any considerable scale was abandoned in England, and no important contributions to our knowledge of this material were made, until, in 1854, Hadow published the results of some valuable investigations, which served to furnish a far more definite knowledge regarding the true constitution and proper method of producing gun-cotton, than had hitherto existed.

In France, gun-cotton was also made the subject of experiments as early as the winter of 1846, and its manufacture was carried on at the Government powder-works at Bouchet, near Paris. Some interesting balistic experiments were instituted, under the direction of Piobert, Morin, and other men of eminence, with gun-cotton, in comparison with different kinds of gunpowder, the results of which indicated that, for producing equal effects to those furnished by a given weight of gun-cotton, it was necessary to employ a double quantity of sporting-powder, three times the quantity of musket-powder, and four times the weight of cannon-powder. It was also found that the best results appeared to be obtained by arranging the gun-cotton so that it should occupy the same space as the charge of gunpowder required to produce an equal effect; and other data were arrived at, which show that the investigators were being led to work in a direction similar to that afterwards so successfully pursued by Baron von Lenk, in Austria. Unfortunately, however, disastrous explosions occurred at the works at Bouchet; one as early as March, 1847, in a drying chamber; and two, following closely upon each other, in 1848. One of these took place in a magazine, near which it was believed that nobody had been for several days; the other occurred also in a magazine where gun-cotton was being packed, and on this occasion several lives were lost. These disasters appear to have put an end, until quite recently, to experiments with gun-cotton in France.

After the material had been pronounced upon unfavourably by the committee of the German Confederation, one of its members, Baron von Lenk, continued to devote himself to its study, and with such success, it appears, that a committee was eventually appointed by the Austrian Government, in 1852, to inquire fully into the merits of the material. A sum of money was paid to Schönbein and Bottger, in recognition of the value of their discovery; and an experimental manufactory of gun-cotton was established at the Castle of Hirtenberg, near Vienna. A particular form of gun was devised by Baron von Lenk, for employment with gun-cotton, of which a 12-pounder battery was established. The performances of these guns were considered sufficiently satisfactory to warrant the preparation of four more batteries, which were sent to the army of observation in Galicia in 1855, but did not go into active service. It appears that, in consequence of a want of uniformity in the effects of the gun-cotton, and of an injurious effect upon the guns, added probably to the prejudice entertained against it by the artillery corps, the material fell into disfavour, and its application in cannon was for a time abandoned.

It was received, however, with much greater favour by the engineers, and was applied with great success to mining and submarine operations. Meanwhile Baron von Lenk's labours to perfect gun-cotton as a material for artillery purposes were unceasing, and, at the close of the Italian war, the subject of its application was again thoroughly reopened at the instigation of Count Degenfeld, then Minister of War, who had, at an earlier period, taken an active interest in Baron von Lenk's investigations. After upwards of one year's experiments, a system of rifled field- and mountain-guns, to be employed with gun-cotton which had been elaborated by Von Lenk, was introduced into the Austrian service; thirty batteries of these guns were equipped, and it was considered as definitely settled that gun-cotton would before long be introduced into the service in the place of gunpowder, for artillery purposes.

In 1862, however, an explosion occurred in a magazine at Simmering, near Vienna, where both gunpowder and gun-cotton were stored; and this disaster appears to have fortified to such an extent the arguments which were adduced against the employment of gun-cotton, by its opponents in the artillery service, that its use in this direction was again put a stop to for a time. Ultimately a committee of investigation was appointed, which consisted in part of eminent scientific men, and which appears, after careful deliberation, to have reported highly in favour of the stability and important properties, as an explosive, of the material,—a report which was supported by the favourable opinion entertained of gun-cotton by the Austrian engineers, in whose name Baron von Ebner prepared a very complete and interesting account of the properties and effects of the agent, with particular reference to mining and other engineering operations.

Gun-cotton appears, therefore, to have been again restored to favour in Austria, but no official accounts have reached England, up to the present time, with regard to its employment in the recent war operations in that country.

In the spring of 1862, full details relating to the manufacture and modes of applying gun-cotton were communicated by the Austrian Government to that of Her Majesty, and the War Office chemist was at once instructed to institute experiments upon the manufacture of gun-cotton, and upon its chemical constitution and stability. In the autumn of that year, General Sabine directed the attention of the British Association to the results obtained with gun-cotton in Austria, and a combined committee of engineers and chemists was appointed to inquire into the subject. At the meeting of the Association in 1863, this committee presented a report, which was based upon information received partly from General von Lenk, who had been permitted by the Austrian Government to visit this country for the purpose of communicating fully with the British Association on the subject, and partly upon the results already arrived at in the experiments instituted by the lecturer, under the direction of the Secretary of State for War. Subsequently, a committee of investigation was appointed by the latter, under the presidency of General Sabine, composed of scientific men connected with the Royal Society and British Association, and of military and naval officers of considerable experience; and this committee has been entrusted with the full investigation of the properties of gun-cotton, as improved by Baron von Lenk, with reference to its application to military, naval, engineering, and industrial purposes.

The chemical constitution of gun-cotton, concerning which the opinions of chemists were divided until 1854, has been conclusively established by the researches of Hadow. In the formation of substitution-products, by the action of nitric acid upon cotton or cellulose, three atoms of the latter appear to enter together into the chemical change, and the number of atoms of hydrogen replaced by peroxide of nitrogen in the treble atom of cellulose, $C_{18}H_{30}O_{15} = 3\,(C_6H_{10}O_5)$, may be nine, eight, seven, or six, according to the degree of concentration of the nitric acid employed.

The highest of these substitution-products is trinitrocellulose, pyroxylin, or gun-cotton; $C_{18}\left\{\begin{matrix} H_{21} \\ 9\,NO_2 \end{matrix}\right\}O_{15} = 3\,C_6\left\{\begin{matrix} H_7 \\ 3\,NO_2 \end{matrix}\right\}O_5$; this being the substance first produced by Pelouze in an impure condition, in 1836, by the action of very concentrated nitric acid upon paper, or fabrics of cotton or linen; and afterwards obtained in a purer form by Schönbein, who employed a mixture of concentrated nitric and sulphuric acids for the treatment of cotton-wool, the object of the sulphuric acid being to abstract water of hydration from the nitric acid, and also to prevent the action of the nitric acid from being interfered with by the water which is produced, as the chemical transformation of the cotton into gun-cotton proceeds. The formation of trinitrocellulose is represented by the following equation:—

$$\underset{\textit{Cotton.}}{C_6H_{10}O_5} + \underset{\textit{Nitric acid.}}{3\left\{\begin{matrix} H \\ NO_2 \end{matrix}\right\}O} = \underset{\textit{Gun-cotton.}}{C_6\left\{\begin{matrix} H_7 \\ 3\,NO_2 \end{matrix}\right\}O_5} + \underset{\textit{Water.}}{3\left.\begin{matrix} H \\ H \end{matrix}\right\}O}$$

The lowest substitution-product from cotton, of those named above, appears to have the same composition as the substance which Braconnet first obtained in 1832, by dissolving starch in cold concentrated nitric acid and adding water to the solution, when a white, highly combustible substance is precipitated, to which the name of *Xyloidin* was given. The substitution-products from cotton, intermediate between the lowest and highest, are soluble in mixtures of ether and alcohol, and furnish by their solution the important material *collodion*, so invaluable in connection with photography, surgery, experimental electricity, etc.

According to Schönbein's original prescription, the cotton was to be saturated with a mixture of one part of nitric acid (of specific gravity 1·5) and three parts of sulphuric acid (sp. gr. 1·85), and allowed to stand for one hour. In operating upon a small scale, the treatment of cotton with the acid for that period is quite sufficient to effect its complete conversion into the most explosive product, *pyroxylin* or *trinitrocellulose;* but when the quantity of cotton treated at one time is considerable, especially if it be not very loose and open, its complete conversion into pyroxilin is not effected with certainty, unless it be allowed to remain in the acids for several hours. This accounts in great measure for the want of uniformity observed in the composition of gun-cotton, and its effects as an explosive, in the ealier experiments instituted; and it is, moreover, very possible that the want of stability, and consequently even some of the accidents, which it was considered could only be ascribed to the spontaneous ignition of the material, might have been due to the comparatively unstable character of the lower products of substitution, some of which existed in the imperfectly-prepared gun-cotton.

The system of manufacture of gun-cotton elaborated by General von Lenk is founded upon that described by Schönbein; the improvements which the former has adopted, all contribute importantly to the production of a thoroughly uniform and pure gun-cotton; there is only one step in his process which is certainly not essential, and about the possible utility of which chemical authorities are decidedly at variance with General von Lenk.

The following is an outline of the process of manufacture of gun-cotton as practised by Lenk. The cotton, in the form of loose yarn of different sizes, made up into hanks, is purified from certain foreign vegetable substances by treatment for a brief period with a weak solution of potashes, and subsequent washing. It is then suspended in a well-ventilated hot-air chamber until all moisture has been expelled, when it is transferred to air-tight boxes, or jars, and at once removed to the dipping tank or vessel, where its saturation with the mixed acids is effected. The acids, of the specific gravity prescribed by Schönbein, are very intimately mixed, in a suitable apparatus, in the proportion originally indicated by that chemist, *i. e.* three parts by weight of sulphuric acid to one of nitric acid. The mixture is always prepared some time before it is required, in order that it may become perfectly cool. The cotton is immersed in a bath of the mixed acids, one skein at a time, and stirred about for a few minutes until it has become thoroughly saturated with the acids; it is then transferred to a shelf in this dipping trough, where it is allowed to drain, and slightly pressed, to remove any large excess of acid, and is afterwards placed in an earthenware jar, provided with a tightly-fitting lid [which receives six or eight skeins, weighing from two to four ounces each]. The cotton is tightly pressed down in the jar, and, if there be not sufficient acid present just to cover the mass, a little more is added; the proportion of acid to be left in contact with the cotton being about 10½ pounds to one pound of the latter. The charged jars are set aside for forty-eight hours in a cool place, where, moreover, they are kept surrounded by water, to prevent the occurrence of any elevation of temperature and consequent destructive action of the acids upon the gun-cotton. The same precaution is also taken with the dripping-trough, as considerable heat is generated during the first saturation of the cotton with the acids. At the expiration of forty-eight hours, the gun-cotton is transferred from the jars to a centrifugal machine, by the aid of which the excess of acid is removed as perfectly as is possible by mechanical means, the gun-cotton being afterwards only slightly moist to the touch. The skeins are then immersed singly into water, and moved about briskly, so as to become completely saturated with it as quickly as possible. This result is best accomplished by plunging the skeins under a fall of water, so that they become at once thoroughly drenched. If they are simply thrown into water and allowed to remain at rest, the heat produced by the union of a portion of the free acids with a little water would be so great as to establish at once a destructive action upon the gun-cotton by the acid present. The washing of the separate skeins is continued until no acidity can be detected in them by the taste; they are then arranged in frames or crates and immersed in a rapid stream of water, where they remain undisturbed for two or three weeks. They are afterwards washed by hand, to free them from mechanical impurities derived from the stream, and are immersed for a short time in a dilute boiling solution of potashes. After this treatment they are returned to the stream, where they again remain for several days. Upon their removal they are once more washed by hand, with soap if necessary; the pure gun-cotton then only requires drying, by sufficient exposure to air at a temperature of about 27° C., to render it ready for use. A supplementary process is, however adopted by General von Lenk, about the possible advantage or use of which his opinion, is not shared by others, as already stated. This treatment consists in immersing the air-dried gun-cotton in a moderately strong hot solution of soluble glass (silicate of potassa or soda), for a sufficient period to allow it to become completely impregnated; removing the excess of liquid by means of the centrifugal machine; thoroughly drying the gun-cotton thus "silicated," and finally washing it once more for some time, until all alkali is abstracted. Lenk considers that by this treatment some silica becomes deposited within the fibre of the gun-cotton, which, on the one hand, assists in moderating the rapidity with which the material burns, and, on the other hand, exercises (in some not very evident manner) a preservative effect upon the gun-cotton, rendering it less prone to undergo even slight changes by keeping. The mineral matter contained in pure gun-cotton which has not been submitted to this particular treatment amounts to about one per cent. The proportion found in specimens which have been "silicated" in Austria and in this country, according to Lenk's directions, varies between 1·5 and 2 per cent. It is difficult to understand how the addition of one per cent. to the mineral matter, in the form chiefly of silicates of lime and magnesia (the bases being derived from the water used in the final washing), which are deposited upon and between the fibres in a pulverulent form, can influence, to any material extent, either the rate of combustion or the keeping qualities of the product obtained by Lenk's system of manufacture.

Gun-cotton, prepared according to the system just described, is exceedingly uniform in composition. The analyses of samples prepared both in Austria and at Waltham Abbey have furnished results corresponding accurately to those required by the formula $C_6 \left\{ \begin{matrix} H_7 \\ 3NO_2 \end{matrix} \right\} O_5$. In its ordinary air-dry condition it contains, very uniformly, about two per cent. of moisture; an amount which it absorbs again rapidly from the air, when it has been dried. The proportion of water existing in the purified air-dried cotton, before conversion, is generally about six per cent. When pure gun-cotton is exposed to a very moist atmosphere, or kept in a damp locality, it will absorb as much as from six to seven per cent.; but, if it be then exposed to air of average dryness, it very speedily parts with all but the two per cent. of moisture which it contains in its normal condition. It may be preserved in a damp or wet state apparently for an indefinite period without injury, for if afterwards dried by exposure to air, it exhibits no signs of change.

In these respects it possesses important advantages over gunpowder. The normal proportion of hygroscopic moisture in that substance varies between three-quarters and one per cent.; but if exposed in any way to the influence of a moist atmosphere, it continues to absorb water until, however firm the grains may have originally been, it becomes quite pasty. It need scarcely be stated that, when once gunpowder has become damp, it can no longer be restored to a serviceable condition, except by being again submitted to the processes of manufacture, starting almost from the commencement.

Perhaps the most vital considerations bearing upon the possibility of applying gun-cotton to important practical purposes, are those which relate to the risk likely to be incurred in its manufacture and preservation in large quantities. The manufacture of gun-cotton is unquestionably much safer than that of gunpowder; in fact, there is no possibility of accident until the final drying process is reached, as in all the other stages, the material is always wet, and therefore harmless. With the adoption of a proper system of warming and ventilation in the drying-chamber, the last operation is certainly not a more dangerous one than that of drying gunpowder. The question of the safe preservation of gun-cotton cannot as yet be so easily and satisfactorily disposed of. Specimens of gun-cotton exist, which were prepared according to Schönbein's directions in 1846, and which have undergone no change whatever; on the other hand, it is well known that gun-cotton, which was believed to have been perfectly purified, has become extremely acid, and has even undergone so complete a decomposition as to have become converted into oxalic acid and other organic products, when preserved in closed vessels, and especially when exposed continually, or occasionally, to light. This susceptibility to chemical change has been particularly observed in samples of gun-cotton known to consist chiefly, or to contain some proportion, of the less explosive or lower substitution-products (*i. e.* gun-cotton specially prepared for the manufacture of collodion). Hence, it is very possible that such instances, as are considered to have been well authenticated, of the spontaneous ignition of gun-cotton, when stored in considerable quantities, or during exposure to very moderate heat, may have arisen not simply from an imperfect purification of the material, but also from the more or less imperfect conversion of cotton into the most explosive and apparently most stable product.

There is no doubt that the improvements effected in the system of manufacture of gun-cotton have been instrumental in rendering it far more stable in character than it was in the early days of its production upon a considerable scale. At the same time, although General von Lenk and its warmest partisans consider that its unchangeability can no longer be disputed, a greater amount of experience, combined with more searching investigations than have hitherto been instituted, upon the possibility of its undergoing change when under the influence of moderate heat, alone or combined with that of moisture, and when preserved under a variety of other conditions, are unquestionably indispensable before its claims to perfect permanence can be considered as properly established. It has already been ascertained by very recent experiments of the lecturer, that gun-cotton prepared and purified with the most scrupulous care, speedily undergoes some amount of decomposition when exposed to temperatures ranging from 32° to 66° C.; it remains to be seen whether such decomposition, if once established by exposure of gun-cotton to some temperature within the above limits, will cease permanently, when the material is removed from the influence of heat, or whether precautions or efficient supplementary processes can be adopted in the manufacture, to counteract the tendency to change exhibited by gun-cotton under the above circumstances. These are only some of the points which need patient investigation before it is positively known whether the requisite confidence can be placed in the material as an agent susceptible of substitution for gunpowder.

It has been ingeniously argued that a slight indication of spontaneous change in gun-cotton need give rise to no alarm, because gunpowder is also liable to slight spontaneous change, reference being made to the fact that a very minute proportion of the sulphur in that material has been noticed to undergo oxidation. It need hardly be stated that such a minute change cannot have the slightest effect upon the stability of the mechanical mixture, gunpowder, in which variations, as regards purity and proportions of ingredients, occur, to an extent which render this change of absolute insignificance; whereas in the case of gun-cotton as now manufactured, the development of acid, however minute the proportion, may very possibly give rise to an important disturbance of chemical equilibrium, in a compound, the stability of which is based upon the perfect uniformity of its composition; and it may also be at once productive of further change, by the tendency which the acid itself has to exert chemical action upon certain elements of the gun-cotton.

The general properties of gun-cotton as an explosive agent have long been popularly known to be as follows:—When inflamed or raised to a temperature ranging between 137° and 150° C. it burns with a bright flash and large body of flame, unaccompanied by smoke, and leaves no appreciable residue. It is far more readily inflamed by percussion than gunpowder; the compression of any particular portion of a mass of loose gun-cotton between rigid surfaces will prevent that part from burning when heat is applied. The products of combustion of gun-cotton, in air, redden litmus paper powerfully; they contain a considerable proportion of nitric oxide, and act rapidly and corrosively upon iron and gun-metal. The explosion of gun-cotton, when in the loose, carded condition—the form in which it was always prepared in the early days of its discovery,—resembles that of the fulminates in its violence and instantaneous character; in the open air it may be inflamed, when in actual contact with gunpowder, without igniting the latter; in a confined space, as in a shell or the barrel of a gun, the almost instantaneous rapidity of its explosion, when in this form, produces effects which are highly destructive as compared with those of gunpowder, while the projectile force exerted by it is comparatively small.

Many attempts have been made, from time to time, to diminish the rapidity of explosion of gun-cotton; but the only one attended by any success is that which, in General von Lenk's hand, has led to the development of a system of mechanical arrangement of gun-cotton, as ingenious and simple as it is effective. By manufacturing the cotton into yarn, of different thicknesses and degress of compactness or fineness of twist, *before* its conversion into gun-cotton, this material is at once obtained in forms which not only burn with great regularity and much less rapidity, when used in the original condition, than the loose gun-cotton wool, but which also, when employed in the form of reels, wound more or less compactly, or when converted into plaits or hollow ropes, may be made to burn gradually, in a manner similar to gunpowder, or to flash into flame instantaneously, exerting an explosive action very far exceeding that of the latter. The modifications in the nature and degree of explosive force exerted by gun-cotton, which are essential for its application to military and industrial purposes, as a substitute for powder, are therefore arrived at by means of very simple variations of the mechanical condition of the material. Thus, to obtain the gradual action essential for the employment of gun-cotton in cannon, cartridges are made up of coarse yarn, which is wound firmly round a hollow cylinder of wood, of dimensions regulated by the size of the gun-chamber and the weight of the charge used, the best result being obtained by so arranging the latter that the cartridge entirely fills the space allotted to the charge in the gun. Similarly, small-arm cartridges are made of cylindrical plaits of fine yarn or thread, which are fitted compactly in layers, one over the other, upon a small cylinder or spindle of wood. In both of these arrangements the combustion of the charge can proceed only from the external surfaces towards the interior of the cartridge. On the other hand, the charges for shells, in which the most rapid explosion is most effective, and the priming for quick-matches which are intended for firing several charges simultaneously and almost immediately upon the application of flame, consist of cylindrical, hollow, and moderately compact plaits (similar to lamp-wicks), made of gun-cotton thread, or very fine yarn. These plaits are produced in pieces of any length, and when employed as quick-matches are compactly enclosed in cases of water-proof canvas or other similar materials. The charges to be used in mines, in which the most destructive effects are aimed at, consist of pieces of very firmly-twisted rope, with a hollow core along the centre, the number of strands of which it is composed varying with the size of the charge to be used. For quarrying and blasting purposes, small lengths of the rope are employed singly; for military operations (demolition of works, etc.), it is packed into moderately stout cases of sheet-metal. In these hollow ropes and plaits of gun-cotton, the flame produced by the burning of that portion to which heat is applied, penetrates at once to the interior and into the interstices of the charge, and hence the entire mass of gun-cotton is converted into gas and vapour, with almost instantaneous rapidity. A striking illustration of the very opposite effects which can be produced by very simple modifications in the mechanical arrangement of the gun-cotton is afforded by the following experiment:—If two or three strands of gun-cotton yarn be very loosely twisted together and inserted into a tube of glass, or other material, in which they fit so loosely as to be readily drawn backwards and forwards, upon applying heat to a projecting portion at one end of the tube, the gun-cotton thus arranged will explode with great violence, completely pulverizing the tube, if it be of glass; and the combustion will take place with such almost instantaneous rapidity that small portions of unburnt gun-cotton will actually be scattered by the explosion. But when two or more strands of the same gun-cotton yarn are tightly twisted, singly in the first instance, then made up into a firm cord, solid throughout, and enclosed in a glass tube or some other description of case into which the cord fits very tightly, if a protruding end of the gun-cotton be then inflamed, the cord will burn with moderate rapidity until the fire reaches the opening of the case, when the combustion will pass over from the ordinary kind to a form which can only be described as a smouldering; the lighted extremity of the gun-cotton simply glows within the case, while a steady jet of flame (furnished by the combustible gases evolved from the gun-cotton) continues to burn at the open extremity of the case until the contents of the latter are consumed. The gun-cotton not only burns extremely slowly under these conditions, but also with the greatest regularity, so that the rate of combustion of a given length of the enclosed cord may be accurately timed. The rapidity of combustion of gun-cotton arranged in this given form may be regulated by the number of strands in a cord, and the degree of their compactness; and it is by this new modification of General von Lenk's system of arranging gun-cotton that the lecturer has succeeded in applying this material to the production of slow-matches and time-fuzees; uses for which it had not previously been found suitable.

Reference has just been made to inflammable gases evolved by gun-cotton while it undergoes a very slow combustion. The composition of gun-cotton renders it self-evident that, under any circumstances, the explosion of this substance must be accompanied by the production of a very considerable proportion of carbonic oxide. The large body of flame, always observed when gun-cotton is ignited under ordinary circumstances, is principally due to the combustion of carbonic oxide and, probably also, of small quantities of carbo-hydrogen compounds, which, together with minute suspended particles of the mineral matter contained in the gun-cotton, give to the flame its brightness. If a tuft of gun-cotton be ignited in a capacious and somewhat deep vessel, the flame actually resulting from the burning of the tuft may be distinctly seen surrounded by a large body of flame, produced by the burning gases, which continue apparent for a very appreciable time after the disappearance of the flash of flame furnished by the explosion of the gun-cotton. If similar tufts be ignited in atmospheres of hydrogen, nitrogen, carbonic acid, coal-gas, etc., the combustion of the gun-cotton is only accompanied by a very small and pale flame, of instantaneous duration. Similarly, if gun-cotton be ignited in a vessel which has been previously exhausted, to at any rate one-half the ordinary atmospheric pressure, the proportion of air, and therefore oxygen, present when the gun-cotton is ignited, does not suffice to effect the combustion of any large proportion of the inflammable gases generated, and hence the explosion of the gun-cotton is attended only by a small pale flame. If, however, the vessel be filled with oxygen, and then exhausted to an equal or even a lower degree, it is filled with flame of dazzling brightness directly the ignition of the gun-cotton is effected.

The one modification, just referred to, of the phenomena which attended the ignition of gun-cotton in a rarefied atmosphere is not the only result observed in experiments of this kind. Various curious effects may be obtained; their nature being determined by the degree of rarefaction of the atmosphere, the mechanical condition of the gun-cotton, its position with reference to the source of heat employed, and other variable elements in the experiments. A brief account of some of the principal of these phenomena may not be without interest.

In the experiments with a tuft of gun-cotton in rarefied air, spoken of just now, a perceptible interval is observed between the first application of heat (by passage of a voltaic current through a platinum wire enclosed in the tuft) and the first appearance of ignition of the gun-cotton; moreover, the pale flame observed when the latter does burn, is of very perceptibly longer duration that than of the bright flash which attends the explosion of gun-cotton in air, under ordinary conditions. If instead of using the gun-cotton in the form of a tuft, a short piece of the gun-cotton yarn be employed in the experiment, and laid on a support so that it rests upon the wire by which it is to be ignited, the pale flame of the burning gun-cotton will travel along towards the two extremities of the piece of yarn with a degree of slowness corresponding to the extent of rarefaction of the atmosphere. These results are in perfect accordance with the observation (first made by Quartermaster Mitchell, afterwards fully examined into by Frankland, and recently amplified by Dufour), that the rate of burning of time-fuzees is influenced by the altitude at which they are burned, or, in other words, by the degree of pressure of the atmosphere, the combustion being proportionately slow with every decrement of pressure of the air. When the platinum-wire is first raised to a red-heat, in the centre of the tuft of gun-cotton enclosed in a highly-rarefied atmosphere, the products resulting from the decomposition of that portion of the material which is in close contact with the wire, immediately distribute themselves through the rarefied space, conveying away, and rendering latent by their great expansion, the heat furnished by the platinum-wire and that which results from the chemical change. The increase of pressure within the confined space, by the generation of the gases and vapours, on the one hand, and, on the other hand, the effect of the heated gases, which escape, upon the particles of gun-cotton through which they permeate, result, in the course of time, in the ignition of the mass; but even then the gun-cotton burns only slowly, because, in consequence of the rapidity with which the resulting gases and vapours escape and expand, much of the heat essential for the maintenance of the combustion is at once conveyed away. The latter result is strikingly exemplified by an experiment in which gun-cotton-yarn is substituted for the tuft of carded gun-cotton; indeed, if the atmosphere be very highly rarefied (to 0·6 in inches of mercury) and a sufficient length of the gun-cotton yarn (4 or 5 inches) be employed in the experiment, the burning of the material, induced by the heated wire, will proceed so slowly, that the heat resulting from the chemical change will be conveyed away from the burning surface, by the gases generated, much more rapidly than it is developed, so that the gun-cotton will actually become extinguished when only a small portion of it has been burned.

A very similar result is obtained if *gunpowder*, either in the form of grains or of one large mass, is exposed to the action of an incandescent platinum wire imbedded in it, the pressure of the atmosphere, in the apparatus in which the experiment is made, being reduced to between 0·6 and 2, in inches of mercury. The portion of gunpowder contiguous to the heated wire will fuse; vapours of sulphur will be evolved in the first instance, and, subsequently, the charcoal will be oxidized by the nitre, bubbles of gas escaping from the fused mass. The vapours and gases thus generated convey away rapidly the heat provided by the wire and developed by the chemical action; and at the same time the change which the gunpowder undergoes diminishes its explosive character, so that its partial ignition or explosion will only be effected after the lapse of several minutes, and, if it be in the form of grains, the explosion of the particles contiguous to the wire will have the effect of scattering the remainder without igniting it.

The great reduction in the rapidity of combustion of gun-cotton is not the only result observed when small quantities of that substance are exposed to heat under diminished atmospheric pressure. In the most highly-rarefied atmospheres (from 0·5 to 1 inch), the only indication afforded of the burning of the gun-cotton is the appearance of a beautiful green glow, like a phosphorescence, immediately surrounding that part which is undergoing decomposition. When the pressure of the atmosphere is slightly increased, a faint yellow lambent flame appears, beyond the green glow, at a short distance from the point of decomposition; and, in proportion as the atmosphere is less rarefied, this pale yellow flame increases in volume, while the green phosphorescence becomes less and less apparent until it seems to be completely obliterated. Lastly, when the pressure of the atmosphere is comparatively great (= 25 or 26, in inches of mercury), the gun-cotton burns with the ordinary bright flame, though less rapidly, of course, than it does under normal conditions of atmospheric pressure. There is no doubt that this bright flame is due to an almost instantaneous secondary combustion (in the oxygen supplied by the air in the apparatus) of the inflammable gases evolved by the decomposition. On the other hand, the production of the small pale flame, observed when gun-cotton is burned in more highly rarefied air, or in atmospheres of gases which cannot supply oxygen for combustion, is most probably due to the generation of a mixture of gases (by the change which gun-cotton undergoes under these conditions), which contains not only combustible bodies such as carbonic oxide, but also a proportion of oxidizing gases (protoxide of nitrogen or even oxygen); such a mixture, having self-combustible properties, will receive sufficient heat from the burning gun-cotton to become ignited, except when the atmosphere in which the change takes place is so highly rarefied that the heat is immediately dissipated and the gases evolved become highly attenuated, as already described.

It will be readily conceived that the mechanical state of the gun-cotton (*i. e.* the particular form in which it is employed), like other variable conditions which have been alluded to, will greatly influence the nature of phenomena observed, when this substance is ignited in air, or in various gases, either at ordinary or diminished pressures. This may be exemplified by the following experimental illustrations:—It has been stated that when a tuft of carded gun-cotton is ignited in carbonic acid, carbonic oxide, nitrogen, coal-gas, hydrogen, and other gases, it burns only with a pale yellow flame; this flame, when furnished by equal quantities of gun-cotton, is much smaller in an atmosphere of hydrogen than it is, for example, in carbonic acid,—a fact which must be ascribed to the comparatively very rapid diffusion of the generated gases when hydrogen is used. In operating with pieces of gun-cotton yarn, instead of employing loose tufts, the material, when ignited by a red-hot wire in atmospheres of carbonic acid, nitrogen in carbonic oxide, burns much more slowly than it does in air under the same conditions; and its combustion is accompanied only by a very small jet or pointed tongue of pale flame, which is thrown out in a line with the burning extremities of the piece of yarn. In the same way, if the yarn is enclosed in a tube or other vessel, through which those gases are circulating, and from which one extremity of the gun-cotton protrudes, when the latter is lighted it will burn in the ordinary manner only until it reaches the opening of the tube, when the form of combustion will at once be changed to that just described. If, however, corresponding experiments are made in atmospheres of hydrogen or coal-gas, the gun-cotton yarn will burn in the slow manner described, but only for a very brief period; indeed, it ceases to burn at all almost instantaneously, just as it does when ignited in a very highly-rarefied atmosphere. This result is not due to the high diffusive powers of the gas in which the gun-cotton is burned, as it may be obtained equally in open and in perfectly-closed vessels; it can therefore only be ascribed to the high cooling powers, by convection, of the gases employed. Pure nitrogen, as stated just now, allows the gun-cotton yarn to burn in the slow manner, but if mixed with one-fourth its volume of hydrogen, it arrests the combustion of the the material, just like coal-gas or pure hydrogen.

A rapid current of air will also effect the transformation of the combustion of gun-cotton from the ordinary to the slow form, if the yarn be enclosed in a moderately wide glass tube, with one end protruding from the tube, so that it may be inflamed in the ordinary manner; but unless the current be very rapid, an explosive mixture of air and the inflammable gases generated from the gun-cotton may be produced in the tube, and become ignited, in which case the gun-cotton will flash into flame instantaneously, and the tube will be shattered by the explosion. If, however, a long piece of thin gun-cotton yarn be passed through a small narrow glass tube, one or two inches long, into which it fits so loosely that it may be drawn through very easily, the change in the form of combustion is effected with certainty, and without the aid of a current of air. When the gun-cotton, thus arranged and placed upon a flat surface, is inflamed at one extremity, it burns as usual until it reaches the one opening of the tube; the slow form of combustion then takes place within the tube, and the gun-cotton will continue to burn in the slow manner, emitting only the small tongue of flame, after the combustion has reached the portion of yarn on the other side of the tube, which will be entirely burned in this peculiar manner. In fact, to change the ordinary into the slow form of combustion of the gun-cotton yarn *in open air*, it is only necessary to pass a piece of the material through a perforation in a diaphragm of wood, cardboard, or paper, and to allow it to rest upon a flat surface on both sides of the diaphragm. The gun-cotton will burn as usual upon one side of the screen, until its combustion reaches the perforation, when the large bright flame will vanish, and the gun-cotton upon the other side of the screen will burn in the slow manner to the end.

The two last experiments show that if the combustible mixture of gases, evolved by the action of heat upon gun-cotton when it is inflamed in open air, are prevented, even for the briefest space of time, from completely enveloping the burning extremity of the yarn or twist; or, in other words, if they are forced for an instant to escape only in a direct line with the burning surface of gun-cotton from which they are emitted, those particles of the latter which are in immediate proximity to the burning portion cannot be raised to the temperature necessary for their rapid and more complete combustion, and hence the gases themselves are in turn not supplied with sufficient heat for their ignition. Now, as the gases which escape unburned convey away a very large portion of the heat developed by the metamorphosis cf the gun-cotton, it is impossible for the latter to continue to burn otherwise than in the slow and imperfect manner. If, however, a flame or highly-heated body be held in the path of the gases as they escape, they will at once be ignited, and the yarn will burst into the ordinary form of combustion. The correctness of this explanation may readily be demonstrated by two or three simple experiments. Thus, if a piece of loose or open gun-cotton yarn is employed in place of the compact material which furnishes the results just described, it is very difficult, or even impossible, to cause the rapid combustion to pass over into the slow form, because the escaping gases cannot be diverted all into one direction, and cannot, therefore, be prevented from transmitting the heat necessary for perfect combustion from particle to particle of the material. Again, if a piece of the compactly-twisted gun-cotton yarn, placed upon a flat surface, is inflamed in the usual manner, and a jet of air is then encircled in a line with the gun-cotton so as to meet the flame, the latter will appear to be blown out, though the cotton still burns; in fact, the burning gases are prevented for an instant from completely enveloping the extremity of the gun-cotton, and hence the combustion at once passes from the quick to the slow form. Conversely, if when the yarn has been made to burn in this slow manner, a very gentle current of air be directed against the burning portion, so as to force back upon the latter the gases which are escaping, thus impeding the rapid abstraction of heat, the gun-cotton will very speedily burst into the ordinary form of combustion, because, under these circumstances, the gases are almost immediately raised to the temperature necessary for their combustion. In the same way, if a piece of the yarn placed upon a board be made to burn in the slow manner, and one end of the board be gradually raised, so that the burning extremity of the gun-cotton is the lowest, the latter will burst into flame as soon as the board has been raised to a position nearly vertical, so that the escaping gases flow back upon the burning surface.

The slow or imperfect form of combustion may be at once induced in the compact gun-cotton yarn, in open air, by applying to any part of the gun-cotton a source of heat not sufficiently great to inflame the gases generated. A wire, or metal rod, heated to any temperature between 135° C. to just below visible redness, or the spark of a thin piece of smouldering string, will invariably produce the result described. Of course this effect, like most of the phenomena described, is to a considerable extent dependent upon the mechanical condition of the gun-cotton, upon the relation between the *quantity* as well as the *degree* of heat applied and the amount of surface of the gun-cotton, and upon other conditions. While a small spark, or a thin platinum wire heated full to redness, only induces slow combustion in the compact gun-cotton yarn, a thick rod of iron, heated only to dull redness, will invariably inflame it in the ordinary manner. A piece of open yarn cannot be ignited so as to burn in the slow manner; on the other hand, the more compactly the gun-cotton is twisted, the more superficial is the slow form of combustion induced in it; indeed, the gun-cotton may be rendered so compact that it will simply smoulder in open air, if ignited as described, leaving a considerable carbonaceous residue; and the heat resulting from this most imperfect combustion will sometimes be abstracted by the escaping gases more rapidly than it is developed, so that the gun-cotton will then actually cease to burn, even in open air, after a short time.

The remarkable facility with which the effect of heat upon gun-cotton may be modified, so as even to produce results totally opposite in their characters, as exemplified by some of the experiments which have been described, renders it easily conceivable that this material may be made to produce the most varied mechanical effects, when applied to practical purposes; that it may indeed be so applied as, on the one hand, to develope a force, very gradual in its action, which may be directed and controlled at least as readily as that obtained by the explosion of gunpowder, while, on the other hand, it may be made to exert a violence of action and a destructive effect far surpassing those of which gunpowder is susceptible. The results arrived at in Austria, which show that gun-cotton may be made to produce effects from three to eight times greater than those of gunpowder, cease to be surprising after a study of the chemical and physical characteristics of this interesting explosive agent.

The products obtained by the explosion of gun-cotton, and its decomposition under various conditions, have as yet been very imperfectly studied, but there is little doubt that they vary in their nature almost as greatly as the phenomena which attend the exposure of the material to heat under different circumstances. It is well known that, when gun-cotton is inflamed in the open air, there is produced (in addition to water, carbonic oxide, carbonic acid, and nitrogen) a considerable proportion of binoxide of nitrogen, so that the gaseous mixture assumes a red-brown tinge, and becomes very acid when it mixes with air. The products of the different forms of imperfect combusit on which gun-cotton has been described as susceptible of undergoing, are undoubtedly much more complex in their character than those just referred to. They include at times a proportion of some substances, not yet examined, which make their appearance as a white vapour or smoke; cyanogen can readily be detected in all the products of imperfect combustion; the proportion of binoxide of nitrogen is generally so large that the gaseous product becomes very highly coloured when mixed with air; peroxide of nitrogen has also been observed in some instances; lastly, there is little doubt that the products occasionally include a proportion of oxidizing gases.

The products which have just been alluded to are the results of the decomposition of gun-cotton either at ordinary or diminished atmospheric pressures; when the explosion of the material is effected in a confined space, in such a manner that the main decomposition takes place under pressure, the metamorphosis which the material undergoes is of a more simple and complete character.

It has been found by Karolyi that when gun-cotton is exploded by voltaic agency in a shell which is burst by the explosion, and which is enclosed within an exhausted chamber, so that the products of decomposition are collected without danger, the results obtained under these conditions are comparatively simple; the analysis of the contents of the chamber, after the explosion, showed that they consisted of carbonic acid 20·82 per cent., carbonic oxide 28·95, nitrogen 12·67. hydrogen 3·16, marsh gas 7·24, water 25·34, and carbon 1·82. The decomposition of gun-cotton under these conditions (which are similar to those of its explosion when employed as a destructive agent) appears, therefore, not to be attended by the production of any oxide of nitrogen. The lecturer found, in some preliminary experiments made under the same conditions as those of Karolyi, that only a minute proportion of binoxide of nitrogen was produced. These results, when compared with those obtained by the ignition of gun-cotton in open air and rarefied atmospheres, show that, just as the decomposition of this material is of a more complicated and intermediate character, in proportion as its combustion is rendered imperfect by diminution of pressure or other circumstances, so, conversely, the change which it undergoes will be the more simple, and its conversion into gaseous products the more complete, the greater the pressure, beyond normal limits, under which it is exploded; that is to say, the greater the resistance offered to the generated gases upon the first ignition of a charge of gun-cotton (and consequently the higher the temperature at which the decomposition of the confined gun-cotton is effected). It is therefore readily intelligible that the notions hitherto generally entertained with regard to the very noxious character of the products of explosion of gun-cotton and their powerfully corrosive action upon metals—based as these notions have been upon the effects observed on exploding gun-cotton in open air—have been proved to be erroneous by the results of actual application of gun-cotton to artillery and other purposes. The foregoing considerations contribute, moreover, to the ready explanation of the fact, established by the experiments in Austria, that the destructive effect of gun-cotton is greatly increased, within certain limits, by increasing the resistance which the products of explosion have to overcome before they can escape into the air.

The conditions (of temperature, pressure, etc.) which influence the nature of the decomposition of gun-cotton, exert, unquestionably, a similar influence upon the nature of the explosion of *gunpowder*, and upon the mechanical effects which the products are capable of exerting. Observations made by the lecturer, in experiments upon the ignition of gunpowder in rarefied atmospheres, point to the existence of products of comparatively complicated character among those found by the gradual decomposition of that material under the conditions described. The earlier investigators (Guy-Lussac, Chevreul, etc.), of the products of explosion of gunpowder, represent these as being of a very simple character, and in harmony with the theory that gunpowder is converted essentially by its explosion into carbonic acid (or a mixture of that gas and carbonic oxide), nitrogen, and sulphide of potassium. But more recent experimenters, Bunsen and Schischkoff, who have made a very elaborate examination of the products which they obtained by the explosion of gunpowder, represent the change to be one of a very complicated character; fix the percentage of solid substances found at a much higher figure than that hitherto accepted; and show that the sulphide of potassium, which has been considered as the principal of these products, was only produced in very small proportion in their experiments. The conditions under which these chemists exploded the gunpowder did not, however, correspond at all in their character to those under which gunpowder is exploded in actual practice, and would, therefore, be very likely to furnish results greatly at variance with those produced when a charge of powder is fired in a gun, a shell, or a mine. That sulphide of potassium is abundantly produced, upon the discharge of a firearm, appears beyond doubt; it may be readily detected in the solid matter which remains in the barrel near the breech; it may be found deposited in considerable quantity near the muzzle of the arm, and there appears strong reason for believing that the flash of flame, observed at the mouth of a firearm upon its discharge, is due in part to the ignition, as it comes into contact with the air, of sulphide of potassium, which has been *vaporized* by the heat of the explosion, and is thus mixed with the escaping gases.

In comparing the effects of gun-cotton, as an explosive agent, with those of gunpowder, and in basing theories, with regard to the difference in the mechanical effects exerted by the two, upon the analytical results of the products of their explosion which have been obtained up to the present time, it is necessary to proceed with great caution, for exceptional results cannot form any sound basis for correct theories or tenable arguments. It can only lead to incorrect conclusions, which may considerably retard the thorough investigation of a most important subject, if the facts be ignored or lost sight of, that, *firstly*, the conditions which practically influence the nature of the products of the explosion of gun-cotton have a similar influence upon the change which gunpowder mady be made to undergo; and that, *secondly*, the effect of heat upon the water produced by decomposition of gun-cotton, which forms so important an element in the the action of this explosive, has most probably its parallel, to no unimportant extent, in the vaporizing effect of heat upon the solids (especially upon sulphide of potassium) produced in the explosion of gunpowder. These are matters which demand their full share of consideration and investigation, before it can be admitted that a sufficient explanation of the remarkable differences between the effects of gunpowder and gun-cotton exists in the assumption, that certain products of decomposition of the former must be regarded entirely as waste matter in the material, simply because they are solid *at ordinary temperatures*. The fact that gun-cotton is *entirely* converted into gases and vapour *at the moment of explosion*, constitutes unquestionably one of the great advantages which that substance possesses over gunpowder; but it is premature, at present, to assume, in comparing the action of the two substances, that only thirty-two (or even sixty) per cent. of gunpowder exist as gas or vapour, *at the moment of its explosion.*

It is to be expected that the investigations which are now being actively pursued upon the true chemical effects produced in the explosion both of gun-cotton and gunpowder, under conditions similar to those which attend their employment in practice, will aid materially in furnishing the correct data so essential for a thorough and impartial comparison of the nature and merits of these two explosive agents.

REPORT ON THE INDUSTRY OF MANURES.

The Reporter is so largely indebted for this section to the collaboration of his friend Mr. F. O. Ward, that he cannot refrain from renewing here, in a special manner, the expressions of gratitude already proffered to that gentleman, in the introduction, for other services of a similar kind.

The great manurial problem, and the grave collateral questions involved in its discussion, are so remote from the sphere of the Reporter's habitual studies, that, in his first sketch of this section, he had merely added to the simple record of the Jury's proceedings the tribute of homage which it was at once his duty and pleasure to offer to the great founder of modern husbandry—Justus Liebig.

Finding, however, that his friend Mr. F. O. Ward had been led, by special circumstances, to bestow particular attention on this subject, the Reporter gladly availed himself of that gentleman's liberal offer, to furnish him with an epitomized view of the question in its most important bearings.

This assistance was the more readily accepted by the Reporter, because, on the one hand, previous experience had assured him that no exposition from his friend's pen would be otherwise than masterly and luminous; whilst, on the other hand, he felt that this report, taken as an outline of modern chemico-industrial progress, would be utterly incomplete, unless the industry of manures, and the great agricultural problems bound up therein, were adequately represented in these pages.

The essay laid before him by his friend, appeared to the Reporter, he does not hesitate to say, one of the ablest and most philosophically conceived compendiums of a complex and difficult subject, that have ever come under his notice. Nay, more—on several points hitherto involved in doubt and difficulty, Mr. F. O. Ward has advanced explanations which the Reporter believes to be as original as they are (to this mind) satisfactory.

He therefore, with pleasure, adopted and indorsed his coadjutor's work: contributing himself, for incorporation into its text, much valuable information, of a special kind, obligingly communicated to him by Messrs. Lawes and Gilbert, Mr. Gruning, and others. The completed section, thus jointly produced, after having undergone careful digestion, has been subjected, as well by his coadjutor as himself, to the most scrupulous revision, in order to the elimination of any incidental errors or misconceptions. That perfect accuracy has been attained on all points, especially on those which are still the subjects of vehement controversy, would be too much to expect. The Reporter will not, however, affect to disbelieve that here and there some useful hint may be gleaned from these pages; some great truth of husbandry be found, set forth in novel aspects; or even some new link appear supplied, in the great chain of agricultural cause and consequence.

It may be indeed, and probably will, be objected, by the advocates of a theory hereinafter somewhat freely disallowed, that neither the Reporter nor his friend can lay claim to any experimental acquaintance with the subject they have undertaken to treat. This disadvantage is admitted; it is a very real one, and it should weigh much with every reader in estimating the value of the opinions here advanced. But it may be alleged on the other hand as a compensating advantage, that in the midst of a vehement controversy, calm bystanders may sometimes discern truths, overlooked by more or less impassioned disputants.

Be this as it may, these prefatory observations will at least prevent even a single reader from attaching to the statements which follow more weight than they may intrinsically possess. For the rest, on Mr. F. O. Ward's behalf as well as on his own, the Reporter can truly say that no labour has been spared to elucidate in these pages the great agricultural problems, now everywhere so anxiously debated, and fraught with such momentous issues, social, political, and economical.

Early History of Manures.—Manures, in the form of cattle-dung and ordinary farm-yard composts, have been known and employed from time immemorial for the fertilization of the soil; but the manures termed "artificial," which have their origin elsewhere than in the farm itself, and are for the most part of concentrated and portable character, have but of late years come largely into use. Nevertheless, the manufacture of these manures, and the trade to which they have given rise, already rank amongst the most extensive of modern industries.

The British patent-rolls record the grant, previously to 1800, of only three patents for manures, dated respectively 1721, 1729, and 1773; whereof the last only, taken out by Baron van Haake, was duly specified. The claim in this case is for a composition of common salt, saltpetre, lime, and Rhenish tartar, which is declared to "possess a magnetic quality, whereby it attracts fertility, and is productive of the effect of manuring arable land," etc.

This curious specification affords a rough measure of the state of popular knowledge and opinion on the subject of manures towards the end of the last century.

The first manure-patent of the present century was granted, in 1802, to one Estienne, for a method of converting human excrement into manure, by gathering it in tanks, decanting its liquid part, drying the solid sediment in the sun (with or without addition of lime), letting this ferment in heaps, and finally crushing it to powder. This was a step in the right direction; though we now know that the treatment suggested, by removing from the compost all its soluble and volatile ingredients, must have destroyed nineteen-twentieths of its value.

In 1806, pounded oyster-shells and gypsum were patented, as a fertilizing mixture, by John Fletcher. This was also a fair proposition. Oyster-shells are slightly phosphatic, and gypsum is known to benefit many soils.

After these slight efforts, invention in this department seems to have slept during more than a quarter of a century; for the next manure patent on record bears date 1835.

In that year, one Pottevin patended a compost of nightsoil with calcined river or pond mud, or other carbonaceous earth. This was a great improvement on Estienne's proposal; seeing that the mud, charred by calcination, and brought to a porous, absorbent condition, would tend to retain and partially disinfect the fertilizing matters, which Estienne's mode operated to volatilize or wash away.

Hence it appears that the first third of the present century produced as many manurial inventions as the whole of the preceding century, and that the inventions produced had improved in character and value, as well as in rate of development. Still there was little to boast of; and half-a-dozen projects, comprising two of moderate utility, represented our total progress in this art (as measured by the patent records) some five-and-twenty years ago.

Course of Early Scientific Research.—In the meantime, however, a vast store of scientific information, tending more or less directly to the elucidation of this important subject, had been in slow and silent course of accumulation, by the successive labours of many eminent experimentalists.

Not to go back further than the last century, nor even than its latter half, we shall find, concentrated in this brief period, a series of brilliant discoveries, bearing more or less directly upon the manurial and agricultural questions, but far too numerous even for the most cursory narration here. Space would fail us even to enumerate the names of European celebrity that adorned this memorable epoch; but if we had to select half-a-dozen of the most illustrious to represent the philosophical activity, British and continental, of the period, we would venture to single out on the one hand, Black, Priestley, and Cavendish; and on the other, Lavoisier, De Saussure, and Berthollet.

During the fifty years in question the nature and composition of *air* and *water*, of *carbonic acid* and *ammonia* (the four main forms of volatile plant-food) were discovered, their gaseous elements isolated, and their properties determined.

The sciences of geology and meteorology at this period also began to take shape and form; enabling an inside to be gained into the origin and nature of cultivable *soils*, and into the *climatic* conditions of plant-growth.

At the same time the laws of the physical forces, particularly those of light and heat, began to be better understood, as well in their general relations as in their special influence on plants.

The introduction of more accurate chemical methods permitted, meanwhile, a closer investigation than had before been possible of the tissues and products of plants, and of the various transformations which those products undergo during the several stages of vegetal development.

The sound physico-chemical principles thus established had the happiest influence on physiological investigations. The organs of plants and of animals were studied in a clearer light than before; and their respiratory, assimilative, and excretory processes, together with the relations established by those processes between the three great kingdoms of nature, were gradually made out.

Among the many illustrious men who assisted in working out these great results, Lavoisier probably deserves the highest place; not, perhaps, as the largest contributor of new truths to the accumulating store—though his contributions of this kind were many and brilliant—but because his vivid imagination, and the eminent generalizing powers with which he was endowed, enabled him to co-ordinate all the scattered researches of his time, and to display innumerable isolated facts in their true subserviency to general laws; so as (among other things) largely to extend our knowledge of the cosmic equilibrium on which sound husbandry can alone be based. Everything, indeed, that Lavoisier did, bore the impress of his master-mind. He it was who first applied the Balance to the study of the phenomena of Life. He it was who first showed that, while plants evolve oxygen, animals, on the contrary, consume it; carbon being oxidized or burned in their bodies as oil is burned in a lamp. His lofty tone of thought, and eloquent language, powerfully impressed his contemporaries; and chiefly to his influence and example the admirable researches of his age owe their high scope and scrupulous precision. Science never endured a severer loss than when Lavoisier met his untimely fate. But his great spirit lived after him; and researches bearing upon the noble themes he had loved to treat were carried on, if possible, with increased activity after his death. The scientific records of Europe were soon crowded with fresh masses of undigested discovery; and in a few years such another mind as his was wanted, to grapple with the growing mass of detail, and once more to create order out of the scientific chaos.

Early in the present century England, in her turn, produced a master-mind—that of the illustrious Sir Humphry Davy—vast in scope and luminous in conception, as any, the greatest, of foregone times. Davy was well fitted to wear the fallen mantle of Lavoisier, and to continue his great work. It is, accordingly, to Davy's genius we owe that memorable treatise—truly described by Liebig as "immortal"—the 'Elements of Agricultural Chemistry.'

In that imperishable work all the scattered results of foregone research in this branch of science were collected and reduced to a system, which was extended and enriched by the author's own capital researches; whereof, perhaps, the most signal (in this department of science) were his analytical investigations of soils (types of all that has since been done in that way); his capital determinations of the composition and transformations of vegetal products; and his admirable experiments on the nutrition of plants, as well by leaf as by root.

To the powerful impulse and just direction impressed by Lavoisier in France, and by Davy in England, on subsequent investigations of like kind, may be ascribed in a great measure their vigorous and successful prosecution by philosophers contemporary with ourselves.

Of these, an encyclopædic list cannot, of course, be given here; and, among so many equally illustrious names, it would be difficult to single out a few, as types to represent the rest. Suffice it to say that to the exertions of these able men we owe a large proportion of the experimental data, on which, as on a firm foundation, the edifice of modern agricultural science, physical, chemical, and physiological, has, so to speak, been stone by stone built up. Honour and gratitude to those who have patiently hewn out those stones from the quarry of undiscovered truth!

But as the true value of the quarried stones is only made apparent by their judicious collocation in the edifice, according to the plan of the architect; so also do experimental data, separately accumulated by the toil of many, only appear in their true value and significance when comprehensively embraced, co-ordinated, and, as it were, fused into a harmonious whole, by the fiery genius of one master-mind. Such a mind was Lavoisier's in the last century; such a service was rendered by Davy to our fathers; and such, to ourselves, are the mind and the service of Justus Liebig.

Thus have France, England, and Germany, in the course of about a century, successively produced the three great Lawgivers of Modern Husbandry.

It was in the year 1837 that the British Association for the Advancement of Science, perceiving the immense accumulation of facts, for the most part unsystematized, which had already taken place in organic chemistry, and was annually increasing therein, invited Justus Liebig, who had already attained to eminence by his extensive researches in this branch of science, to write a report upon its then condition; which honourable duty the illustrious philosopher undertook.

In the year 1840, Liebig, in fulfilment of this engagement, produced his memorable work on 'Organic Chemistry in its Applications to Agriculture and Physiology.'

In ordinary hands, such a report would, in all probability, have been but a compilation, more or less compendious, of facts already known, and conceptions already proposed for their co-ordination. But the original genius of Liebig, essentially philosophical and constructive, impressed upon his work a very different character.

He began by sweeping away the fallacious theoretical views which were at that time in vogue—particularly the so-called "Humus theory,"—and replacing them by a theory of his own, wider in scope, and more conformable with truth. With this, the so-called "Mineral theory," as a general clue for his guidance, Liebig was enabled to thread the labyrinth of intermingled facts and fallacies, which had necessarily resulted from so many investigations, inductive and deductive, carried on for so many years, by so many independent thinkers and experimentalists, and recorded in so many scattered memoirs. All these he was enabled to weigh and appreciate, by the criterion of a new law, or rather system of laws, themselves evolved during his large induction, and established (in a great measure) by help of the very facts they served to elucidate and connect.

Profiting by the controversial criticism which his book, on its appearance, did not fail to provoke, Liebig made it more perfect in successive editions; and extended it by additional volumes, some modestly entitled 'Familiar Letters,' some promulgated as codes of Natural Law, but all forming parts of a connected series, in which, as in a mirror, is displayed the progressive development of Liebig's views, in the light of his own and of contemporary researches. By these labours, pursued with unwearied industry during upwards of twenty years, Justus Liebig has unquestionably shed upon his all-important theme a flood of light, as copious and brilliant to the full as that which it successively received, in former days, from the luminous minds of Lavoisier and Davy.

Indeed, of the affiliation of his labours to those of his immediate predecessor, Liebig himself, in the dedication of his work to the British Association, speaks with becoming humility, and justifiable pride:—

"I have endeavoured," he says, "to follow the path marked out by Sir Humphry Davy, who based his conclusions only on that which was capable of examination and proof. This is the path of true philosophical inquiry, which promises to lead us to truth—the proper object of our research."

Of Liebig's views, and of the rapid and profound revolution of opinion they brought about, occasion will arise to speak in a subsequent page. Meanwhile, it may suffice to remark that, amongst other things, they completely overthrew the conceptions previously entertained as to the nature and operation of manures.

Modern History of Manures.—The impulse given by Liebig's first book to manurial industry is very distinctly traceable in the registry of British patents.

During the ten years which followed its publication, *i. e.* between 1840 and 1850, no less than thirty-six patents for manurial processes and products were enrolled; being six times as many, in ten years, as had been obtained in all preceding time since patents were first granted.

During the next five years this manurial movement went on in an accelerating ratio; no less than ninety-six more patents having been registered between 1850 and 1855. The lowering of the charge for patents, which occurred during this interval, no doubt had its share of influence on this result.

The patent statistics since 1855 are not before the Reporter; but he is enabled to state, in general terms, that the activity of research and invention in this department has by no means declined during the last seven years, and that the manurial inventions brought forward in England since 1840 may be approximatively estimated as numbering at least 200.

This long series of inventions comprises plans and processes for turning to account, as manure, almost all the known forms of animal waste and ejecta; such as, for example, the night-soil and sewage of towns; the rags of woollen, silken, and leathern clothing;

the *débris* of manufactures in which horn, bone, hides, bristles, gut, and other organic and nitrogenous materials are used; the spent animal or bone-charcoal of the sugar refineries, and other phosphatic residua; the ammoniacal liquors of gas-works; the alkaline wash-waters of soap, dye, bleach, and many other factories: in a word, several hundred forms of residua—nitrogenous, phosphatic, and alkaline—formerly cast away as worthless rubbish.

These the respective patentees propose to subject to various processes, mechanical, physical, and chemical; such as, for example, in the case of liquors, to concentration by boiling down, or precipitation by chemical agency; in the case of solid residua, to crushing, grinding, or other process of comminution; or to chemical disintegration by powerful solvents, acid or alkaline, according to the circumstances in each case; or to maceration in water; or to torrefaction by fire; or to digestion, at low or high pressure, sometimes in moist, sometimes in dry or superheated steam.

Several of the patents include recipes for mixing the products thus obtained with each other, or with products of a different origin, to adapt them (as the inventors allege) for special crops, or for peculiar soils.

Many of these proposals possess merit; though a still larger number exhibit ignorance on the projectors' part; while a certain percentage almost seem to have been concocted with a view to profit by the ignorance of others.

Superphosphate of Lime Manufacture.—First in importance, and *nearly* first also in chronological order, among the manure patents enrolled since the publication of Liebig's book in 1840, stands the celebrated patent granted in 1842 to Mr. J. B. Lawes,* for converting tricalcic into monocalcic phosphate by means of sulphuric acid. The invention of this process, so far as it applies to the treatment of recent bones, is not claimed by Mr. Lawes, but belongs to Justus Liebig, who suggested it in his great work already quoted. As this suggestion has become the foundation of the modern industry of manures, and its authorship has been the subject of controversy, the Reporter feels bound to record, in the foot-note below, Liebig's own words on the subject.†

The great merit of Mr. Lawes consists, first, in his having extended the application of sulphuric acid to phosphates of *mineral* origin, such as apatite, and to the *fossil* bone phosphate known as coprolite; and, secondly, in his having devised means and appliances for carrying out the manufacture on an industrial scale. Those upon whom it has devolved to organize a new industry, and to overcome the difficulties that spring up, unforeseen, at every stage of such a work, will know how to appreciate at their just value Mr. Lawes's services in this respect. Indeed, in his double capacity, as a manufacturer of manures, and as an indefatigable experimentalist on their effects, Mr. Lawes merits recognition as one of the most active promoters of agriculture now living. Nor would it be just, in such a mention, to overlook the large share of service rendered by Dr. Gilbert, the able coadjutor of Mr. Lawes in the experimental and analytic department of his labours.

Mr. Lawes appears to have made his first essays in the manufacture of superphosphate in 1841–2; and, on the success of these experiments to have begun his great manufactory at Deptford in 1843. Many similar works have since sprung up, and the manufacture has grown to enormous magnitude. Mr. Lawes himself produces 18,000 to 20,000 tons of superphosphate annually; and the total yearly production of superphosphate in Great Britain is estimated by him as ranging from 150,000 to 200,000 tons.

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* Lawes (J. B.), Patent No. 9353, May 23, 1842.

† "The form in which they [bones] are restored to a soil does not appear to be a matter of indifference. For the more finely the bones are reduced to powder, and the more intimately that they are mixed with the soil, the more easily are they assimilated. The most easy and practical mode of effecting their division is to pour over the bones, in a state of fine powder, half of their weight of sulphuric acid diluted with three or four parts of water, and after they have been digested for some time to add 100 parts of water, and sprinkle this mixture over the field before the plough. In a few seconds, the free acids unite with the bases contained in the earth, and a neutral salt is formed in a very fine state of division. Experiments instituted on a soil formed from *grauwacke*, for the purpose of ascertaining the action of manure thus prepared, have distinctly shown that neither corn nor kitchen-garden plants suffer injurious effects in consequence, but that, on the contrary, they thrive with much more vigour."—'Organic Chemistry in its Application to Agriculture and Physiology,' pp. 184–5.

Mr. Lawes has favoured the Reporter with the following interesting particulars as to the most recent and improved mode of manufacturing superphosphate, its average composition, and its present market price:—

"The phosphatic materials are first ground to a very fine powder by mill-stones; the powder is then carried up by means of elevators, and discharged continuously into a long iron cylinder, having agitators revolving within it with great velocity. A constant stream of sulphuric acid, of sp. gr. 1·66, enters the cylinder at the same end as the dry powder, and the mixture flows out at the other end in the form of a thick mud, having taken three to five minutes in passing through the machine. The quantity turned out by such a mixing-machine is about 100 tons daily. The semi-fluid mass runs into covered pits 10 to 12 feet deep, each of sufficient size to hold the produce of the day's work. It becomes tolerably solid in a few hours, but retains a high temperature for weeks, and even months, if left undisturbed.

"The composition of a superphosphate of good quality, made partly from mineral phosphate and partly from ordinary bones, may be stated as follows:—

Soluble phosphate	22	to	25	per cent.
Insoluble phosphate	8	„	10	„ „
Water	10	„	12	„ „
Sulphate of lime	35	„	45	„ „
Organic matter	12	„	15	„ „

Nitrogen 0·75 to 1·5 per cent.

"If sufficient sulphuric acid were used to decompose the whole of the phosphate of lime, the product would be too wet to be packed in bags, and would require either to be mixed with extraneous substances of a dry and porous nature, or to be artificially dried.

"The price of the best descriptions of superphosphate ranges from £5. 15*s.* to £6. 10*s.* per ton, and of that made from purely mineral phosphate from £4 to £5. 5*s.* per ton."

Of the raw materials annually worked up into superphosphate in Great Britain, Mr. Lawes estimates that about half is derived from the deposits of fossil bone-earth, or coprolite, discovered of late years in several parts of England. Bone-ash, chiefly imported from South America, animal charcoal from Germany, and bones from all parts of the world, together supply about forty per cent. more of the raw material; while the remaining ten per cent. of the total supply is made up by guano (chiefly of the less nitrogenous and more phosphatic kinds) wish a little apatite (say 200 to 500 tons per annum) obtained from Spain, Norway, and America.

Importation of Manures into Great Britain.—These data alone might serve to indicate that the industry of manures, since the impulse it received in 1840, has afforded occupation not only to the inventive and manufacturing, but also to the commercial activity of the English nation. But of this the origin and development of the guano trade affords direct evidence,

The British guano trade can scarcely be said to have existed, as a regular branch of commerce, before Liebig drew attention to the subject. Its principal importers, Messrs. Gibbs and Sons, only began their trade in 1842, two years subsequently to the appearance of Liebig's work, which dwelt strongly on the value of this deposit. In 1841 guano had already been tried on sixty English farms, as appears from a report published in that year by the Council of the Royal Agricultural Society. A few such trials had, in all probability, been made in the two or three preceding years; seeing that several cargoes of guano were imported and sold (at upwards of £20 per ton) by a Mr. Myers, before Messrs. Gibbs engaged in the business. The statistics of the entire guano trade are not before the Reporter; but of its development during the last twenty years some idea may be formed from the experience of Messrs. Gibbs and Sons. That eminent firm in the first year of their trade (1842) only imported 182 tons of guano; in 1843 their importations had already reached 4667 tons; and in 1862, the twentieth year after their commencement, their total supplies (as well for foreign as for British consumption) had attained to the enormous rate of 435,000 tons per annum. Of that vast total, from a fourth to a third was retained for use in the United Kingdom. It may interest agricultural readers to know that at the outset of the regular guano trade the price ranged between £10 and £15 per ton; that during the two years, 1846–48, it remained at £9, its lowest point; that during the next four years 1849–53, it advanced but slightly, to £9.

5*s.*; reaching £10 in 1854; £11 in 1855; £12 in 1856; and £13, its highest recent point, in 1857. Since that time it has slightly declined; and now rules at about £12.*

The extraordinary success of the Peruvian guano trade led to voyages of discovery in search of fresh deposits; several of which have been found and extensively worked on the islands of the West African coast and elsewhere. Nor has commercial enterprise confined itself to guano. Nitrate of sodium, formerly valued chiefly as a substitute for saltpetre in the sulphuric acid manufacture, has of late years come more and more largely into use as a powerful fertilizer; and the vast deposits of this substance successively opened up in several parts of the South American continent are now extensively worked for the supply of the English manure-market. As for bones and bone-ash, they have been imported by thousands of shiploads, not merely from the boundless South American pampas,—feeding-grounds and cemeteries of unnumbered herds, from immemorial time,—but also from populous European countries, whose soil could by no means spare them so well, and whose fertility must have been seriously impaired by their withdrawal.

Good and Evil of the Trade in Manures.—The manure trade presents itself, therefore, in two aspects; the one advantageous, the other detrimental to mankind. Nothing can be more advantageous than the collection and utilization of fertilizing residua formerly cast away as worthless. The fossil phosphates quarried out of the bosom of the earth, and the guano extracted (by the successive intervention of seaweeds, fishes, and penguins) from the depths of the ocean, are evidently so much treasure fairly won from nature for the legitimate enrichment of mankind. Even the withdrawal of recent bones and bone-ash, from plains untenanted as yet save by wild cattle, to fertilize the corn-fields of the populous old world, must be accounted a legitimate commerce. But the boundary line is overpassed, and the manure trade becomes abnormal, when bones are withdrawn from one populous country to enrich the exhausted fields of another.

Nor is the detriment thus occasioned confined to the country whose soil is impoverished. In the closely-knit relations of modern commerce, the impoverishment of any one commercial country reacts on the prosperity of all the others, by diminishing the stock of exchangeable wealth in the world. If Germany, for instance, grows less corn, her purchasing power for foreign goods, say French or British, is proportionately diminished, and commerce suffers *pro tanto.* The gain to France or England is, therefore, but illusory, if either robs a neighbour's soil to fertilize her own.

In a work just published, Baron Liebig sternly rebukes England for her over-eagerness to buy up, in the form of bones, the phosphatic wealth of countries less advanced than herself in financial and industrial power, and for the apparent recklessness with which she squanders forth these treasures (ill-gotten and ill-spent) down her innumerable sewers to the sea. The great agricultural teacher manifests alarm at the superabundant zeal with which the most diligent of his pupils obeys his lessons; and to other nations he earnestly points out the ruinous consequences that must ensue to them, from the exportation of phosphates, drawn from their soil, to stay the exhaustion of the English fields. His cry of warning is couched in terms of almost passionate invective:—

England (he exclaims) is robbing all other countries of the conditions of their fertility. Already, in her eagerness for bones, she has turned up the battle-fields of Leipzic, of Waterloo, and of the Crimea; already from the catacombs of Sicily she has carried away the skeletons of many successive generations. Annually she removes from the shores of other countries to her own, the manurial equivalent of three millions and a half of men; whom she takes from us the means of supporting, and squanders down her sewers to the sea. Like a vampire she hangs upon the neck of Europe, nay, of the entire world, and sucks the heartblood from nations, without a thought of justice towards them, without a shadow of lasting advantage for herself.

It is impossible (he proceeds to say) that such iniquitous interference with the Divine order of the world should escape its rightful punishment; and this may perhaps overtake England even sooner than the countries she robs. Most assuredly a time awaits her, when all her riches of gold, iron, and coal will be inadequate to buy back a thousandth part of the conditions of life, which for centuries she has wantonly squandered away.

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* The Reporter is indebted for this information to his friend Mr. J. F. Gruning.

‡ 'Einleitung in die Naturgesetze des Feldbaues.' Von Justus von Liebig. Braunschweig: Vieweg und Sohn, 1863.

It must be admitted that these strictures, though somewhat harsh in tone, are not without a certain degree of truth. It may, however, be urged, on the other hand, that they apply only to one branch, among many, of British manurial industry, and even to that branch only partially; for, since the British coprolite beds have been extensively worked, they have supplied fossil phosphate at a price so low as to supersede, in a great measure, the supply of recent bones, for agricultural purposes, from continental countries. Nor do the laws of political economy permit us to doubt that undue scarcity, artificially created, gradually raises market price, to an extent which becomes at last prohibitory; so that the evil provides its own corrective. Of this, indeed, a very apposite illustration reaches the Reporter while he writes. M. Clemm-Lennig, manufacturer, of Mannheim, informs him that English fossil phosphates are being extensively exported to Germany; he himself (M. Clemm-Lennig) receiving considerable supplies of this material from British ports. The balance of trade seems, therefore, to be arriving at a just equilibrium in this matter, as indeed it always does, if only it be left to swing freely.

(*To be continued.*)

ACTION OF IODINE, BROMINE, AND CHLORINE UPON SUGAR.

I do not know of any work upon chemistry,* or of any chemist, having described the action of iodine on sugar; yet the changes which take place between these two bodies deserve being studied by scientific men.

I have only to report a series of facts, the result of my experiments since 1856, in the preparation of the syrup of the iodide of iron, which led me to study the action of iodine, bromine, etc., upon sugar.

I have observed the two following facts:—

1st. The partial spontaneous decomposition of the syrup of iodide of iron by exposure to the air is arrested at a certain point, and does not go further, even if exposed for several months in a capsule only covered with paper.

2nd. This syrup, slightly decomposed, or even coloured by the addition of a small quantity of iodine, becomes perfectly white after a long exposure to the sun's rays or to a moderate heat; replaced in the dark, it resumes its amber colour.

However, two vials hermetically sealed, each containing the syrup of iodide of iron, one coloured by natural decomposition, the other by the addition of a small quantity of iodine, were exposed for a year to the sun's rays, then both syrups were colourless, and they remained so for more than a year, though they were left in a dark cellar, and in half-filled bottles.

The first fact reverses the old theory of the decomposition of the syrup of iodide of iron, which was explained by the formation of a protoxide of iron and iodohydric acid, by means of the decomposition of the water into its two elements, and by the transformation of the protoxide of iron into sesquioxide of iron by the oxygen of the air. Evidently, should the decomposition of the water and of the iodide of iron operate thus, this process should continue to that point when all the iodide of iron is decomposed; this does not take place.

To explain the second fact, I asked myself what became of the free iodine? for surely it could not combine itself with the protoiodide of iron to form a sesqui-iodide, the sesqui-iodide of iron being red, should have remained so. We know, on the other hand, that water dissolves hardly more than $\frac{1}{7000}$ of iodine, which, after some chemists, is transformed into iodic and hydriodic acids. The last question was, then, to know how free iodine acted upon sugar.

To elucidate this question I made various experiments with iodine and simple syrup. I soon found that, with a moderate and prolonged heat, this metalloid added to the syrup was subject to a great chemical change.

One to ten grains of iodine, added to one ounce of simple syrup, in a strong bottle closed with a glass stopper, the whole exposed in a water-bath at a moderate heat (60° C.), are dissolved little by little, and give the liquid a reddish-brown colour; but after several hours, the whole being always kept at the same temperature, the syrup

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* See Gmelin's Handbook, vol. xv. 252.—Ed. Am. Jour. Pharm.

again becomes discoloured. The flask must be cautiously shaken from time to time. The whole operation occupies about forty-eight hours.

In operating with a syrup containing half a drachm of iodine to the ounce, I obtained, with some trouble, however, a similar colourless product.

The greater the proportion of iodine, the more attention is required; and towards the end of the operation, care must be taken to remove the syrup as soon as it turns white.

Arrived at this point, if the preparation is left exposed to heat, it soon colours again; by-and-by the sugar is transformed into caramel; and this burned sugar, quickly destroyed in its turn, gives rise to carbonic acid, and to a blackish, light, and spongy substance, partly soluble in water and alcohol. Treated by hydrochloric acid, potash, etc., this substance shows the same reactions as ulmin and ulmic acid. To carry on this operation to the entire decomposition of the sugar, all necessary care must be taken to prevent a fracture of the flask by the expansion of carbonic acid gas, which is formed in quantities, and can be collected.

The more the temperature is elevated, the larger is the proportion of iodine, and quicker is the sugar decomposed.

This white syrup of iodine, or iodinized syrup, has sometimes an aroma of fruit; it is acid, unalterable by air, heat at 100° C. decomposes it; it contains much glycose. Treated with the reagents, it behaves like iodides in general.

These are the facts; the theory remains to be given.

Does the iodine, all or in part, combine with the sugar $C_{12}H_{11}O_{11}I$, or to the glycose $C_{12}H_{14}O_{14}I$, to form iodides similar to the iodide of starch, $C_{12}H_{10}O_{10}I$?

Or rather, in presence of sugar acting as a catalytic agent, should not iodine decompose the water into its elements, hydrogen and oxygen, and unite with them to form hydriodic and iodic acids? If so, these acids once formed, would decompose the sugar precisely in the same way as the mineral and some other acids.

If not so, what are these acids, and how are they formed? Is it from the decomposition of the sugar, or of the water?

Bromine acts upon sugar in the same manner as iodine, with the difference that the diverse phenomena follow more rapidly.

Chlorine acts upon simple syrup still more promptly than bromine; into water freshly saturated with chlorine, at a very cold temperature, I have thrown sugar, and heated the liquor as I have described for iodine. In less than half an hour the chlorine had disappeared, and the liquor was acid.

Chlorine was probably transformed into hydrochloric acid.—*Amer. Journ. Pharm.*

E. Fougera, *Pharmacien, New York.*

MISCELLANEA.

Poisoning by the Seeds of the Curcas Purgans (Jatropha Nuts).—About thirty boys, a short time since, had a narrow escape from being poisoned by eating these nuts. It appears that by order of the London and North-Western Railway Company a sale of several sacks of these nuts had taken place, and a quantity of them were allowed to lie scattered about the floor. The boys obtained access to them, and not only ate the nuts, but gave some to their companions; all the boys were taken very ill, and some were conveyed to the General Hospital, where, by the employment of prompt treatment, they were restored. An interesting paper on the properties and uses of these nuts, by Dr. Hamilton, will be found in this Journal, Vol. V. p. 23.

Poisoning by Decoction of Tobacco.—On Wednesday, July 13, a lady named Pickersgill, residing at Clapton, died from the effects of drinking half a pint of decoction of tobacco, taken, it is supposed, medicinally, as she had been suffering from illness for some time.

Suicide by Laudanum.—On Tuesday, May 10th, Mr. George Fielding, of Albion Street, Bayswater, committed suicide by drinking laudanum. Shortly before five o'clock he retired to his room, desiring his daughter to call him at six o'clock, having previously expressed his intention of going to the theatre. On entering his room, Mr. Fielding was found lying on the bed, and a bottle, which had contained laudanum, lying by his side. Medical aid was obtained, but life was extinct.

Deaths from Chloroform.—An inquest was held on Friday, June 24th, at King's College Hospital, on the body of Mrs. E. Ruth, aged 29, who died from the effects of the vapour of chloroform during an operation for removing a tumour in the urethra. A question arose as to the quantity administered to her on a former occasion, and the absence of books of reference in such cases in the hospital. The following verdict was returned:—"That the deceased died from the effects of the vapour of chloroform," and the jury expressed their opinion that proper case-books for reference should be kept in the hospital. Another fatal case occurred at Middlesex Hospital on Tuesday, July 5th. This was an operation for the removal of a large tumour from the face, during which the patient died on the operating table. A third fatal case occurred at St. Mary's Hospital, where an inquest was held on Monday, July 18, on the body of James Birch, aged 56, who expired while under the influence of chloroform, administered previous to an operation for the removal of the bone of the great toe. A *post-mortem* examination showed that there was extensive disease of the heart.

Poisonous Sheep Dressings.—Mr. Gamgee, in a letter to the 'Lancet,' July 23, draws attention to the evils arising from the use of arsenic and mercury in sheep-dressings, and states that these, and other agents poisonous to man and animals, can be entirely superseded by products alone destructive to parasites. Mr. Gamgee states that "thousands of sheep, poisoned with mercurial ointment, are sold annually in the meat markets, and cases of injury to man and animals by arsenic and mercury, direct and indirect, are by no means uncommon," and suggests that analyses of sheep-dips, and cases of poisoning should be published in the 'Lancet,' with the view of inducing some legislative enactment for the purpose of preventing the evils referred to.

BOOKS RECEIVED.

THE CHEMICAL PROCESSES OF THE BRITISH PHARMACOPŒIA, AND THE BEHAVIOUR, WITH REAGENTS, OF THEIR PRODUCTS. By HENRY J. CHURCH. London: Robert Hardwicke, Piccadilly. 1864.

HALF-YEARLY ABSTRACT OF THE MEDICAL SCIENCES. January to June, 1864. John Churchill and Sons, New Burlington Street.

TO CORRESPONDENTS.

Mr. Rastrick, of Southsea, has called our attention to the fact that the characters of the two species of *Sanguisuga* have been transposed in the British Pharmacopœia.

Herbarium (Lowestoft).—See 'Pharmaceutical Journal,' vol. v. 2nd series, p. 434; Bentley's 'Manual of Botany.

A Registered Apprentice (Newcastle).—Fownes's 'Manual of Chemistry,' Babington's 'Manual of British Botany.'

Medical Student (London).—An abridged edition of Pereira's 'Materia Medica and Therapeutics' is advertised to be ready in October. It will be edited by Dr. Farre, Professor Bentley, and Mr. Warrington.

Chemicus (Chester).—The cost of a licence for the sale of *Methylated Spirit* in quantity of less than a gallon, is £2. 2*s.* per annum. A separate licence is not required for the sale of *Finish.*

A Correspondent wishes for a good formula for making Blacking.

Mr. H. George is thanked for his communication.

Erratum.—For "William Griffiths, Jersey," read "Swansea."

Instructions from Members and Associates respecting the transmission of the Journal before the 25th of the month, to ELIAS BREMRIDGE, Secretary, 17, Bloomsbury Square, W.C.

Advertisements (not later than the 23rd) to Messrs. CHURCHILL, New Burlington Street. Other communications to the Editors, 17, Bloomsbury Square.

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THE PHARMACEUTICAL JOURNAL.

PHARMACEUTICAL RESPONSIBILITY.

The case recently decided in the Liverpool Court of Assizes, in which an action was brought by the representative of the late Mr. Lingard against Messrs. Clay and Abraham, for having accidentally substituted strychnine for James's powder in a medicine prepared at their establishment, thereby causing the death of the patient, cannot fail to excite a deep interest among the members of our body. This unfortunate accident has already been adverted to in our pages. The medicine was supplied in the ordinary course of business by one of the first dispensing establishments in Liverpool, and it was prepared by an assistant who is admitted to have been a qualified, experienced, and careful dispenser. There has been no imputation, in this case, of want of knowledge in those by whom the medicine was sold, and the arrangements adopted in the house for securing accuracy in dispensing are considered to have been unusually complete and good. Yet even here an accident occurs by which the death of a respectable tradesman has been caused, and the chemist is rendered liable for heavy damages. Every dispensing chemist throughout the country must feel that the case of Messrs. Clay and Abraham may at any time be his, for it is impossible to provide an infallible remedy against accidents of this kind.

We believe, however, that this is the first time such an action has been brought against a chemist, and the result is calculated to occasion serious reflections upon the responsibilities attending the practice of pharmacy. The action in this case was founded upon a law passed in 1846, known as Lord Campbell's Act, and entitled "An Act for Compensating the Families of Persons killed by Accidents." It appears that this Act was principally intended to provide compensation to the families of persons killed by railway accidents; but as accidents of that particular class are not specified, the law applies to other cases of death caused by the wrongful act, neglect, or default of some person other than the deceased. As the Act is a very short one, and as the preamble explains the nature and object of the change it effected in the law of the land, we insert it here *verbatim*. It is as follows:—

"Whereas no action at law is now maintainable against a person who by his wrongful act, neglect, or default, may have caused the death of another person, and it is oftentimes right and expedient that the wrong-doer in such case should be answerable in damages for the injury so caused by him: Be it therefore enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, that whensoever the death of a person shall be caused by wrongful act, neglect, or default, and the act, neglect, or default is such as would (if death had not ensued) have entitled the party injured to maintain an action and recover damages in respect thereof, then and in every such case the person who would have been liable if death had not ensued shall be liable to an action for damages, notwithstanding the death of the person injured, and although the death shall have been caused under such circumstances as amount in law to felony.

"2. And be it enacted, that every such action shall be for the benefit of the wife, husband, parent, and child of the person whose death shall have been so caused, and shall be brought by and in the name of the executor or administrator of the person deceased; and in every such action the jury may give such damages as they may think proportioned to the injury resulting from such death to the parties respectively for whom and for whose benefit such action shall be brought; and the amount so recovered, after deducting the costs not recovered from the defendant, shall be divided amongst the before-mentioned parties, in such shares as the jury by their verdict shall find and direct.

"3. Provided always, and be it enacted, that not more than one action shall lie for and in respect of the same subject-matter of complaint; and that every such action shall be commenced within twelve calendar months after the death of such deceased person.

"4. And be it enacted, that in every such action the plaintiff on the record shall be required, together with the declaration, to deliver to the defendant, or his attorney, a full particular of the person or persons for whom and on whose behalf such action shall be brought, and of the nature of the claim in respect of which damages shall be sought to be recovered.

"5. And be it enacted, that the following words and expressions are intended to have the meanings hereby assigned to them respectively, so far as such meanings are not excluded by the context or by the nature of the subject-matter; that is to say, words denoting the singular number are to be understood to apply also to a plurality of persons or things; and words denoting the masculine gender are to be understood to apply also to persons of the feminine gender; and the word 'person' shall apply to bodies politic and corporate; and the word 'parent' shall include father and mother, and grandfather and grandmother, and stepfather and stepmother; and the word 'child' shall include son and daughter, and grandson and granddaughter, and stepson and stepdaughter.

"6. And be it enacted, that this Act shall come into operation from and immediately after the passing thereof, and that nothing therein contained shall apply to that part of the United Kingdom called Scotland.

"7. And be it enacted, that this Act may be amended or repealed by any Act to be passed in this Session of Parliament."

Previously to the passing of this law, although a person who had sustained an injury by the act of another could recover damages from the person causing the injury, yet in the event of the injured person dying from the effects of the injury, his executors or administrators had no such remedy; but a sort of fine of the estimated value of the instrument or object by which the injury was immediately inflicted, and which was called a *Deodand*, was paid to the Crown. A deodand (*Deo dandum*) is described by Sheridan as "a thing given or forfeited to God for pacifying his wrath, in case of any misfortune by which any Christian comes to a violent end without the fault of any reasonable creature." Thus, in the case of a railway or other accident, in which human life was destroyed, the object, such as part of the railway train, by which the fatal injury was inflicted, became a deodand; but the immediate relatives of the deceased could obtain no compensation for the loss they sustained. By Lord Campbell's Act, the means of recovering compensation in such cases are provided, and in most instances in which the law has hitherto been applied, its operation has been felt to be just and beneficial. When railway companies are called upon to pay heavy damages for the loss of life caused by accidents on their lines, it often happens that injuries which would otherwise be ruinous to the families of the deceased are greatly mitigated, without any very sensible loss being inflicted upon any individuals, for the penalties imposed upon the railway companies, being spread over large constituencies, are scarcely felt by the separate members of those corporate bodies. But it is far otherwise where individual tradesmen incur similar penalties for acts committed in the exercise of their legitimate occupations, and over which, possibly, they have no control.

There is no business in which the risk of such penalties is so great as it is in that of the chemist and druggist. The pharmaceutical chemist has important and very responsible duties to perform in supplying the public with medicines, many of which, although valuable remedial agents when judiciously administered, are highly dangerous and destructive to life when given in excessive doses. His occupation, in dealing with these dangerous agents, is one in which there is a greater liability to accidents than occurs in any other business, and yet the remuneration he obtains for the onerous duties performed in the service of the public is, in most instances, extremely small. For many years past, circumstances have tended to reduce rather than augment the profits of a pharmaceutical establishment, and especially in the dispensing department. Frequent have been the complaints of want of adequate remuneration for the toilsome, responsible, and anxious duties of the pharmaceutist, caused partly by a change in the nature of medical practice, and partly by an unhealthy competition, and too great facility for men to enter the business at little cost and with limited qualifications.

The introduction into medicine of the active principles of plants and the use of concentrated preparations, in place of the milder medicines formerly employed, has rendered the risk of accident greater and the profits of dispensing less; while a change in the law, which has been made at the same time, has caused a new penalty to be imposed upon the ill-requited druggist for occurrences which cannot be wholly obviated, and to which there must therefore be some liability.

When it comes to be known—for we believe the fact has not until now been realized, and probably by many of our members has not even been suspected—that there is this new liability,—that in addition to all the other distracting cares of his business occupations, the druggist is always subject to the occurrence of an accident which may involve him in utter ruin,—an accident moreover which may be the result of listlessness, or even ill-will, on the part of a paid assistant, —great will be the depression produced in many anxious minds.

That this liability does exist there can be no doubt, for in the Liverpool case the defendants consented to a settlement involving the payment of £1500 damages, besides heavy law expenses, on the representation of their legal advisers that the only question to be decided was as to the amount of compensation that might be considered by a jury equivalent to the loss sustained by the widow and children of the deceased. The Liverpool 'Daily Post,' in commenting upon the case, says,—"Counsel told them, and told them soundly, that however excellent the regulations of their shop, however competent their servants, however uniformly faultless the operations of their trade, they must pay a penalty proportioned to the station and means of the victim of the accidental error which was committed." In this instance, the deceased having been a plumber in a good business, the loss was estimated by mutual consent at £1500. What might it not have been if it had happened to a barrister or civil engineer in large practice, or to a bishop or judge?

Messrs. Clay and Abraham will be deeply sympathized with by all their brethren; their case will be anxiously and painfully reflected upon by thousands who will feel that a similar if not a heavier infliction may be impending to any one of them.

And now, does it not behove us to consider how we can best turn this occurrence to account in providing for the future? Can anything be done to lessen the risk of dealing with poisonous or dangerous drugs? We believe—but here we express only an individual opinion—that not only may something be done to lessen the risk of accidental poisoning, and thus to afford increased security to sellers as well as purchasers of dangerous drugs, but that there is great room for improvement upon existing arrangements, and that there is an urgent call for prompt and energetic action with reference to this subject. We must not be understood here to imply that the pharmaceutists or druggists of this country are careless or inattentive to the interests of the public or of themselves. There is no ground for such an imputation, and probably there is no country in which the dispensers of medicine are more conscientious and anxious to fulfil their duties in a satisfactory manner than they are in this country; but there is a want of concert and of uniformity of action. There are many plans and many good plans, each thought by its author to be the best, but may there not, by concentration of thought and combined application, be something done towards the discovery of a system suitable for general adoption, the best that can be devised, and that which the greatest number of the wisest and most experienced men would approve of?

Whatever arrangements may be adopted, however, they will but lessen—they cannot wholly obviate—the liability to accidents in dealing with poisonous drugs. There will still be the reflection that an accidental error may entail upon the most careful a ruinous penalty. Are there any means by which this painful reflection may be dispelled or relieved? It may be urged that the number of accidents such as we refer to is very small. Hundreds of men engaged in the same business pass through life without ever experiencing such a misfortune, yet when it does come it is grievous to bear. The reflection of having accidentally but innocently caused the death of a fellow-creature, and the loss of confidence which such an occurrence may occasion in the public mind, are punishments enough to ensure the most careful attention to the arrangements required for the public safety. May there not be something done to relieve the individual who stands legally responsible for a fatal accident, when the most approved precautions have been adopted, from the infliction of an unmerited although it may be not an unjust penalty?

BRITISH PHARMACEUTICAL CONFERENCE.

The time has just arrived for the first gathering of the British Pharmaceutical Conference; we say the *first* gathering, because the meeting at Newcastle last year could only be considered as preliminary, and at Bath the true business of the Association will commence.

At Newcastle, the chief subject proposed for consideration was the desirability of establishing an annual Conference, and although an evening was devoted to science, the organization of the Conference was the one important business of the year. We believe it will be proved at Bath that the promoters did not overestimate the interest taken in pharmaceutical investigation throughout the country; and we hope by our next month's report to be satisfied also that there is in our body neither lack of talent to conduct such investigation, nor of public spirit to publish individual experiences for the general good.

We learn that there are sufficient papers to be read on this occasion to give ample occupation for the time at the disposal of the Conference (of course, care must be taken to interfere as little as possible with the engagements of pharmaceutists who are also members of the British Association); and glancing at the questions "suggested" and "accepted," scarcely one of which fails to address itself to the practical pharmaceutist as well as the scientific chemist, we cannot but feel assured that the meeting will be a good one.

Mr. Pooley, the Local Secretary, offers his services to members of the Conference needing accommodation during the meeting, and the hospitable example of Newcastle will doubtless be followed at Bath.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *3rd August*, 1864,

Present—Messrs. Bird, Deane, George Edwards, J. B. Edwards, Hanbury, Haselden, Hills, Mackay, Morson, Orridge, Reynolds, Sandford, Savage, and Waugh,

The following were elected Members of the Society:—

Berdoe, Edward ....London.
Hampson, Robert .. ..Alderley Edge.
Willsher, Stephen H............................Tenterden.

Professor Archer, of Edinburgh, was elected an Honorary and Corresponding Member.

The first Examination for Chemists and Druggists in business on their own account was fixed for the 21st October.

The Reports of the Professors and Director of the Laboratory were read, and the Sessional Prizes and Certificates awarded.

The Report of the Examiners on the competition for the Pereira Medal and Bell Scholarships was read, and the awards made to the successful candidates—which will be duly announced at the October Meeting.

These prizes and certificates will be distributed at the Evening Meeting on the 5th October next, when the successful competitors will be expected to attend.

BENEVOLENT FUND.

The sum of Twenty Pounds was granted to the orphan children of a late London Member.

The following subscriptions and donation were announced as received during the month of July:—

Aitken, William, Edinburgh ...	£0	5	0
Baildon, Henry C., Edinburgh...	1	1	0
Carmichael, Lauchlan, Edinburgh	0	5	0
Gardner and Ainslie, Messrs., Edinburgh	0	10	0
Kemp, David, Portobello	0	10	0
Lindsay, Robert, Edinburgh......	0	10	0
Mackay, John, Edinburgh	1	1	0
Macfarlan, John K. F., & Co., Edinburgh	1	1	0
Raimes, Blanshard, & Co., Edinburgh	1	1	0
Halliday, William J., Manchester	0	10	6
Orridge, Benjamin B., 30, Bucklersbury	1	1	0

DONATION.

Messrs. Battley and Watts, 32, Whitecross Street.................£10 10 0

PROVINCIAL TRANSACTIONS.

EXCURSION OF THE LIVERPOOL CHEMISTS' ASSOCIATION.

The annual excursion of the members and friends of the Liverpool Chemists' Association took place yesterday to St. Helen's. As on former occasions, the trip was to a large extent of a professional character, and intended to afford an opportunity of acquiring information in regard to the application of chemistry to purposes of manufacture. Certainly the town of St. Helen's and its neighbourhood, which was the object of the Association's visit, under other circumstances would have possessed no special attractions. To go where smoke abounds and pure air may be esteemed a luxury, is scarcely consonant with rusticity; but as scientific inquiry was on this occasion paramount, the district presented an extensive field. The party, numbering about forty, left the Lime Street Station at twelve o'clock, and were conveyed by rail to St. Helen's. Immediately on their arrival, they proceeded upon a tour of inspection of several of the large establishments. The first establishment visited was the well-known chemical works of Mr. A. G. Kurtz, where they were received by the manager, Mr. Duffey, who courteously conducted them through the whole of the manufactory under his charge. The works, which are amongst the largest in the neighbourhood, cover an area of no fewer than eight acres, and are fitted up with all the appliances that improved skill could suggest for the speedy and successful conduct of the chemical business. At present there are about 450 men employed, and the premises generally present a scene of great activity. In the building known as the burning hall, where soda ash is produced from barytes, about 50 furnaces are in constant operation. The process of producing sulphuric acid, in which extensive leaden cisterns are employed, is extremely interesting, as also the formation of the soda crystals exposed in numerous iron pans. The manufacture of muriatic acid forms, of course, an important feature in the business at these works. Once a source of invariable annoyance to the surrounding district, it has, within the last few years, been so simplified as to remove a great deal of the effluvia previously emitted. By a late Act of Parliament the gas has to be condensed, and for this purpose two condensing towers are erected, and are found to be highly successful. Upon leaving Mr. Kurtz's establishment, the party had a somewhat different treat afforded them by an inspection of Mr. G. H. Daglish's extensive iron foundry. The visit was an opportune one, inasmuch as preparations were completed for the largest casting made in the works —that of a block anvil, weighing upwards of 20 tons, for the new ironworks at Garston. The operation of running the metal was successfully performed, and was attended with no little interest to the spectators. A visit to the crown and sheet glassworks of Messrs. W. and R. Pilkington formed the last item in the afternoon's programme. Here the party were shown the several processes employed in the manufacture of glass, which, although familiar in principle to the visitors, were especially attractive on account of the extensive scale whereon they are conducted. The mode of staining and enamelling the glass, involving a vast deal of skilful manipulation, and displaying much artistic taste, was especially interesting, and occasioned many an interesting inquiry. Messrs. Pilkington's works are three in number, and employ an immense number of hands, no fewer than 2000. When the time allotted for the visit had expired, the party proceeded to Thatto Heath, where dinner was provided at six o'clock at the Victoria Gardens. The chair was occupied by the President of the Association, Mr. Shaw, and the vice-chair by Mr. Redford, the Vice-President. A substantial dinner was provided by Mr. Whittle, the host. The chairman gave the customary loyal and patriotic toasts, which were warmly received; that of "The Army, Navy, and Volunteers" being acknowledged by Mr. Stewart. Mr. Barley then proposed "Prosperity to the Chemists' Association," which, after being drunk amidst loud applause, was responded to by the Vice-President, who said he must congratulate them upon the fact that so many had been that day enabled to leave their counters, for in this age of keen competition it required no small amount of moral courage to leave the shop for a few hours. For himself, he might say that he should take home a store of information which he hoped would be of some practical use to him. After expressing the gratification they must feel in regard to the conduct of the proprietors of the several works for their kindness in throwing their establishments open, remarking upon the intelligent industry collected within those manufactories, the speaker said he thought the members might look with much pleasure upon the position of their association. He considered that they held a very respectable place amongst the learned societies of Liverpool. They had afforded a great deal of instruction to the public in the past, and they had done much for the chemists of the town by advancing them in knowledge and respectability. Though he could not say the numbers of the association were few, he should like to see them augmented; for he felt sure there were many who ought to join, and who would find it to their advantage were they to do so.

He concluded by proposing "The honorary members of the Chemists' Association." The toast having been drunk, Mr. N. Mercer gave "The health of the gentlemen whose works had been visited—Messrs. Kurtz, Daglish, and Pilkington." He thought the liberality of those gentlemen was the more commendable because there were manufacturers who had a great objection to their works being visited, especially by persons engaged in the same trade. It had been his good fortune to visit most of the alkali works in the district, and there was none in which such order and regularity prevailed as in that of Mr. Kurtz. For himself he was surprised at the progress made in Mr. Daglish's iron foundry; and as to the Crown Glass Company, it bore one of the greatest names in the world. The toast was severally acknowledged by Mr. Duffey, on behalf of Mr. Kurtz; Mr. Young, for Mr. Daglish; and Mr. Gardner, for Messrs. Pilkington. Amongst the remaining toasts were "The Pharmaceutical Society," by Mr. Wharrie; "The town and trade of St. Helen's," by Mr. John Matthews, and acknowledged by Mr Young, who proposed "The town and trade of Liverpool," to which Mr. Blighton replied. The party shortly afterwards separated and returned to Liverpool, much gratified with their excursion and with the courtesy of the gentleman through whose kindness they were enabled to make their tour of inspection.

BRITISH PHARMACEUTICAL CONFERENCE.

The meeting for the present year will be held at Bath,—at 41, Milsom Street. It will commence on Wednesday, the 14th September, at 10 A.M., and be continued on a subsequent day or days, according to the amount of business to be transacted. Many interesting papers on pharmaceutical subjects are promised, and a large gathering of members is expected. The presence also in the town of the members of the British Association for the Advancement of Science, from the 13th to the 23rd of September, will be sure to render a visit to Bath even more pleasant than usual.

Intending visitors to Bath, at the meeting in September, who will require accommodation, are requested to communicate their intention to the Local Secretary without delay. The Committee are anxious to know what number to expect, but will only take apartments specially if requested to do so.

JOHN C. POOLEY,
8, *George Street, Bath.* *Local Secretary.*

ORIGINAL AND EXTRACTED ARTICLES.

NOTES ON THE CASES OF POISONING BY CALABAR BEANS IN LIVERPOOL, 10TH AND 11TH AUGUST, 1864.

BY J. BAKER EDWARDS, PH.D., F.C.S., LECTURER ON CHEMISTRY AND MEDICAL JURISPRUDENCE AT THE ROYAL INFIRMARY SCHOOL OF MEDICINE, LIVERPOOL.

1. About seventy children were poisoned by eating the beans, of whom about fifty were treated at the Southern Hospital in this town. The quantity taken by each child was from half a bean to six beans. The nuts were cracked, and the kernel eaten without the spermoderm.

2. The children were mostly under ten years of age, and the poison generally produced nausea and vomiting in half an hour. The secondary symptoms, trembling, dizziness, and loss of power in the limbs, came on within an hour of administration. Within three-quarters of an hour to one hour after eating, the children were brought to the hospital and at once treated with emetics. In the one case which proved fatal, the emetics (sulphate of zinc and mustard water) failed to act, and the child died by syncope within a quarter of an hour of his admission. He was said to have eaten four beans.

3. The organs were found healthy, except some tuberculous disease in the lungs. The blood was very fluid. The heart contained fluid blood and clot in

all the four cavities, indicating death by paralysis of the muscles of the heart. Although there was no reddening of the coats of the intestines, there had been purging, which had removed all fæcal matter, leaving only in the intestines a whitish semi-fluid emulsion of the seed. The bladder was perfectly empty and contracted. There was really nothing in the *post-mortem* appearances to indicate the cause of death, except the peculiar contents of the intestines, and had these been removed by purging, there would have been nothing to distinguish between death by this poison and death by cholera. From my chemical analysis I should also infer that although in this instance circumstances favoured the detection of the poison in the intestines after death, yet in a minimum fatal dose, or a prolonged purging before death, nothing would be found in the body to identify the poison or to account for death.

I am indebted to Dr. Frazer, of Edinburgh, who has investigated the subject with great ability, for a valuable communication during my analysis, and the tests Nos. 3, 4, and 5 in my analysis were suggested by him.

Conclusions.

1. The bean is edible in poisonous quantities, and although slightly rough in its flavour, does not appear to excite disgust or alarm when eaten alone, and would be undiscovered when mixed with food.

2. The symptoms are not always immediate, nor is vomiting induced, except when the dose is excessive; nor would the secondary symptoms, viz. dizziness, faintness, and loss of power in the limbs, excite sufficient alarm to call for medical assistance until life was really in immediate danger.

3. The symptoms would scarcely be distinguished from sudden indigestion or English cholera in time to save the life of the patient.

4. In criminal cases, nothing might be detected by autopsy or by chemical analysis to reveal the cause of death.

5. So insidious a poison should not only be stored, but also handled with great caution; its alcoholic solutions or extractive, when introduced into the circulation, acting as a slow but certain poison, leaving no trace in the body which can be identified by chemical tests in our present knowledge of the poison.*

ABSTRACT OF THE REPORT OF THE COMMITTEE OF THE ROYAL MEDICAL AND CHIRURGICAL SOCIETY, ON CHLOROFORM.

In laying their Report before the Council of the Medical and Chirurgical Society, the Committee on Chloroform desire to state that they have made comparatively little reference to the medical portion of the subject. This is not due to their thinking the medical uses of chloroform of little importance, but to the fact that but few replies to their inquiries upon this point have been received.

In view of the great extent of the subject submitted to their consideration, the Committee directed their attention to such points as appeared to them of chief practical importance. Thus their observations respecting the action of chloroform on the nervous system, and their remarks on some other points, are less full than would have been desirable had the Committee regarded such details as of equal importance with those specially elected for investigation—such as its influence on the action of the heart and on respiration.

The Committee have chiefly confined their physiological report to observations which they have themselves made. Without overlooking or neglecting the labours of former investigators, they have endeavoured rather to furnish an accurate account of experiments which they have observed carefully and together, and to compare the results thus obtained and agreed upon with the phenomena of cases in which death or peril of life has arisen from the inhalation of chloroform in the human subject.

Physiological conclusions.—The sequence of the phenomena produced by chloroform inhalation in animals is similar to that observed in man, and if the same percentage of

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* For Analysis, see pp. 136–137.

the agent be administered, the results produced are nearly uniform. The first effect of chloroform-vapour is to increase the force of the heart's action; but this effect is slight and transient, for when complete anæsthesia is produced, the heart in all cases acts with less than its natural force. The strongest doses of chloroform-vapour, when admitted freely into the lungs, destroy animal life by arresting the action of the heart; whilst by moderate doses the heart's action is much weakened for some time before death ensues, respiration generally, but not invariably, ceasing before the action of the heart, death being due both to the failure of the heart's action and to that of the respiratory function. The danger attending the use of chloroform increases with the degree of stupor it induces; the apparent irregularities in the action of the anæsthetic mainly depending on the varying strength of the vapour employed, on the quality of the chloroform, and on the constitution of the patient. In order that it may be administered with comparative safety, it is necessary that the proportion of vapour should not exceed $3\frac{1}{2}$ per cent.; that its effects should be carefully watched, and the inhalation suspended when the required anæsthesia is induced.

In many respects the action of ether is similar to that of dilute chloroform. At first its vapour increases the force of the heart's action,—an effect which is both greater and of longer duration than that observed with chloroform. The stimulation is followed by a depression of the force of the heart's action, but at the same degree of insensibility ether does not depress the action of the heart to the same extent as chloroform. Eventually ether kills, partly by enfeebling the action of the heart, but chiefly by arresting the movements of respiration. Thus the energy with which chloroform acts, and the extent to which it depresses the force of the heart's action, render it necessary to exercise great caution in its administration, and suggest the expediency of searching for other less objectionable anæsthetics. Ether is slow and uncertain in its action, though it is capable of producing the requisite insensibility, and is less dangerous in its operation than chloroform. On the whole, however, the Committee concur in the general opinion which in this country has led to the disuse of ether as an inconvenient anæsthetic.

A mixture of ether and chloroform is as effective as pure chloroform, and a safer agent when deep and prolonged anæsthesia is to be induced; though slow in its action, it is sufficiently rapid in its operation to be convenient for general use. A mixture composed of three parts of ether, two parts of chloroform, and one part of alcohol (by measure), is to be preferred, on account of the uniform blending of the ether and chloroform when combined with alcohol, and the equable escape of the constituents in vapour; and the Committee suggest that it should be more extensively tried than it has hitherto been in this country.

Effects of chloroform on the fauces.—The sudden administration by the mouth of concentrated chloroform-vapour induces a spasm of the fauces, which lasts for some seconds; afterwards, when the animal has inspired, the phenomena of asphyxia are for a time associated with those of chloroform poisoning, and death is finally induced as by dilute chloroform. If, however, partial insensibility is first induced by weaker chloroform, no spasm of the fauces ensues upon the sudden administration of the concentrated form of the agent.

Post-mortem appearances.—Judging from the observations on animals,—the appearances in the human subject having been noticed in but few cases, and being insufficient for yielding satisfactory conclusions,—it appears that though there may in certain cases be an impediment to the free circulation of the blood through the lungs, yet the appearances are very different after death has been caused by chloroform from those observed when life has been destroyed by asphyxia. In death from chloroform, all the cavities of the heart are distended, and the cases are only exceptional in which the left side is empty. The rule, however, is alike in both,—that the cavities of the right side contain more blood than those of the left.

Resuscitation—The most certain means of restoring life after poisoning with anæsthetics is by artificial respiration. By this means resuscitation may generally be accomplished after natural respiration has ceased, provided the heart continues to act, and it may *sometimes* be effected even after the cessation of the heart's action; but this result is exceptional. Galvanism resuscitates within the same limits as artificial respiration; it is, however, far less to be relied on than artifical respiration in equal cases. With either remedy it is found that animals quickly rendered insensible by a strong dose are more easily recovered than those which have been gradually narcotized even by a small percentage of the anæsthetic.

Rules relating to the Administration of Chloroform.

The anæsthetic should on no account be given carelessly, or by the inexperienced; and when complete insensibility is desired, the attention of its administrator should be exclusively confined to the duty he has undertaken.

Under no circumstances is it desirable for a person to give chloroform to himself.

It is not advisable to give an anæsthetic after a long fast, or soon after a meal; the best time for its administration being three or four hours after food has been taken.

If the patient is much depressed, there is no objection to his taking a small quantity of brandy, wine, or ammonia, before commencing the inhalation.

Provision for the free admission of air during the patient's narcotism is absolutely necessary.

The recumbent position of the patient is preferable; the prone position is inconvenient to the administrator, but entails no extra danger. In the erect or sitting posture there is danger from syncope. Sudden elevation or turning of the body should be avoided.

An apparatus is not essential to safety, if due care be taken in giving the chloroform. Free admixture of air with the anæsthetic is of the first importance, and, guaranteeing this, any apparatus may be employed. If lint, or a handkerchief, or a napkin is used, it should be folded as an open cone, or held an inch or an inch and a half from the face.

The anæsthetic should invariably be given slowly. Sudden increase of the strength of the anæsthetic is most dangerous. Three and a half per cent. is the average amount, and four and a half per cent. with ninety-five and a half of atmospheric air, is the maximum of the anæsthetic which can be required. Given cautiously at first, the quantity, within this limit, should be slowly increased according to the necessities of the case, the administrator being guided more by its effect on the patient than by the amount exhibited.

The administrator should watch the respiration of his patient, and should keep one hand free for careful observation of the pulse.

The patient who appears likely to vomit whilst beginning to inhale the anæsthetic should be at once brought fully under its influence, and the tendency to sickness will then cease.

The occurrence during the administration of an anæsthetic of sudden pallor or of sudden lividity of the patient's countenance, or sudden failure or flickering of the pulse, or feeble or shallow respirations, indicates danger, and necessitates immediate withdrawal of the anæsthetic until such symptoms have disappeared. On the occurrence of these symptoms, and especially if they should become so urgent as to threaten death from failure of respiration, of heart-action, or of both together, the following rules of treatment are to be observed:—Allow free access of fresh air; pull forward the tongue, and clear the mouth and fauces; keep or place the patient recumbent; dash cold water on the face and chest, and aid the respiratory movements by rhythmical compression of the thorax. In the more threatening cases artificial respiration must be commenced instantly; and this rule applies equally in all cases, whether the respiration has failed alone, or the pulse and respiration together. Galvanism may be used in addition to artificial respiration, but the artificial respiration is on no account to be delayed or suspended in order that galvanism may be tried.

Few if any persons are unsusceptible of the influence of chloroform, from two to ten minutes being required to induce anæsthesia. The time, however, varies with age, temperament, and habits.

The mixture of chloroform, ether, and alcohol should be given in the same way as chloroform alone; care being taken, when lint or a handkerchief is used, to prevent the too free escape of the vapour.

Use of Chloroform in Surgical Operations.

With heart disease the anæsthetic may be given in any case which requires an operation, although when there is evidence of a fatty, weak, or dilated heart, great caution is demanded. Valvular disease is of less importance.

In phthisis, when an operation is unavoidable, the anæsthetic may be given with impunity.

For all operations upon the jaws and teeth, the lips, cheeks, and tongue, the anæsthetic may be inhaled with ordinary safety. By care and good management the patient may be kept under its influence to the completion of the operation. In these cases, blood, as it escapes, if not voided by the mouth, passes into the pharynx. If any small quantity finds its way through the larynx, it is readily expelled by coughing. In operations upon the soft palate, fauces, pharynx, and posterior nares, if sudden or severe hæmorrhage is likely to occur, it is not advisable to induce deep insensibility.

In cases requiring laryngotomy and tracheotomy the anæsthetic may be employed with safety and advantage.

For operations upon the eye, involving the contents of the globe, the use of anæsthetics is open to objection on account of the damage which the eye may sustain from muscular straining or vomiting. If employed, profound insensibility should be induced.

In operations for hernia, and in the application of the taxis, the anæsthetic acts most beneficially. For most operations about the anus profound anæthesia is positively demanded.

In the condition of shock, or of great depression, as after hæmorrhage, careful administration of the anæsthetic diminishes the risk of an operation.

In all cases other than those specially referred to, it is sufficient to state, so far as a mere surgical operation is concerned, that an anæsthetic may invariably be administered.

The continuous vomiting occasionally induced by, and following upon, the inhalation of anæsthetics, may be injurious by consequent exhaustion, as well as by mechanically disturbing the repair of a wound. With this reservation, they do not appear to interfere with the recovery of patients from surgical operations.

Statistics.—The results of 2586 capital operations performed before, and of 1860 performed since, the introduction of anæsthetics, collected from all authentic available sources,* prove that anæsthetics have in no degree increased the rate of mortality.

Use of Chloroform in Obstetric Practice.

(*a*) *In natural labour.*—The careful administration of chloroform during labour is not attended with special danger, there being, either in this country or abroad, so far as is known to this committee, no well-authenticated instance of sudden death where it has been given by a medical practitioner; but the occasional occurrence of unfavourable symptoms demands the exercise of caution during its employment. Administered in a moderate degree, it does not, as a rule, weaken the expulsive powers, and is decidedly beneficial in promoting dilatation of the maternal passages. It does not predispose to puerperal convulsions or other like complications. The balance of opinion is nearly equal as to whether it predisposes to imperfect contraction of the uterus after delivery. As a rule, it in no way retards the convalescence of the mother; nor has it any tendency to interfere injuriously with the function of lactation; nor has it any injurious influence on the child.

(*b*) *In abnormal labour.*—The anæsthetic may be employed with advantage in various obstetrical operations—as forceps, turning, craniotomy, and extraction of retained placenta,—unless the patient is much enfeebled by hæmorrhage; when, if given, it ought to be accompanied by the use of stimulants. It may also be employed advantageously to check the paroxysms in puerperal convulsions.

(*c*) *As to the preference of Ether. Rules relating to the administration of chloroform.*—There are no reasons for giving preference to ether over chloroform, the latter being much more desirable in obstetrical practice generally, the only exceptions being those in which chloroform notably disagrees.

In addition to those given for its administration in ordinary cases, it is generally desirable to observe the following rules during its administration in labour, subject to modifications at the discretion of the practitioner:—In natural labour, begin to give it generally at or after the termination of the first stage; but it may be given earlier if the first stage is unduly painful, or if the os uteri resists dilatation. Give it only during the pains, and withdraw it in the intervals. When the fœtal head bears on the perineum, give it more freely, to promote relaxation and relieve the increased pain. Withdraw the chloroform immediately after the child is expelled. If the patient is depressed or the pains are sluggish during its administration, an occasional stimulant may be administered. In cases where it seems to interfere with the progress of labour it may be necessary to suspend its use for a time, and reapply it after an interval, or even to withdraw it altogether. In turning and instrumental deliveries deep anæsthesia must be induced, as in surgical operations, and the administration should then be entrusted to a competent person, whose sole duty should be to attend to it. In midwifery a special inhaler for its ad-

* Appendix D to the Report, p. 149.

ministration is not generally necessary or desirable, a handkerchief or towel, so folded as to prevent blistering of the face and to allow free admixture of atmospheric air, being sufficient for the purpose.

(*d*) *Use of chloroform in diseases of women and children.*—In the treatment of diseases of women, chloroform may be employed to facilitate and lessen the pain of certain examinations. In cases of spurious pregnancy and phantom tumours, by relaxing the abdominal parieties, it may assist in demonstrating their true characters; and acting in the same way, it may help the practitioner to define more accurately the character and relations of other abdominal and pelvic tumours, or to detect feigned disease.

As a therapeutic agent, its inhalation, and external application in the form of a liniment, may be usefully employed to allay pain in some cases of severe dysmenorrhœa, neuralgia, and the like.

There is accumulated testimony in favour of chloroform inhalation proving serviceable in various spasmodic diseases of women and children, as whooping-cough complicated with convulsions, spasmodic croup, epileptic seizures, and some other forms of convulsion in children; hysterical convulsions, epilepsy, and various muscular contractions in women.

The President expressed in warm terms the obligations the Society were under to the committee for their able and laborious Report.

Mr. Curling regretted that so much time had elapsed since the committee had been formed. But, as would appear when the paper and the appendix were published, much more work had been done than would be thought from the part of the abstract which had been read. There had been a division of labour into three chief departments—physiological, surgical, and obstetrical. But the most work had been done by the first section—the physiological. This section had had seventy meetings, and had performed very many careful experiments. When all this was taken into consideration the Fellows would not be surprised that the Report had been delayed. The committee wished to acknowledge the support afforded by many Fellows of the Society and by the profession generally. Mr. Curling said that he must allude more pointedly to the labours of the reporters, Mr. Sibley and Mr. Callender. These gentlemen had attended all the meetings of the committee, and it was, after hearing the Report, scarcely necessary to express any opinion as to the great zeal, devotion, and intelligence they had displayed.

Dr. Kidd said a great debt of gratitude was due to Mr. Curling and the Physiological Committee for their incessant labours; yet he could not help thinking the great chloroform question at present was, as to its safety or use, a question of practical or empirical observation in hospitals, rather than a question of physiology. Nobody denied that very large doses killed animals. We had similar experiments in vast number in books, but the deaths in practice in the human subject are from idiosyncrasy (from which the lower animals are free), from errors of administration, emotion, fright, in the convulsive or preliminary stage before deep anæsthesia at all, deaths from the spasm of the glottis, apnœa, almost always in trivial operations, like tooth-drawing, rather than in the half-hour's deep narcotism of large operations. Physiological experiments, such as dropping chloroform on the heart of a frog, or throwing it into the peritoneum, are fallacious; the experiment kills, but not the chloroform. Then, as to "mixtures" of anæsthetics, they have been used extensively in Austria and France, even by order of Government. The ether was found to be first inhaled, then the chloroform, and the spirit of wine remains behind and has to be squeezed out: they tend towards mystery and are cumbersome. The best part of the Report is as to the value of electro-magnetism in resuscitation; but it is an error that the little magnet-box is not accessible in hospitals. It is equivalent to saying saving life is not important. The midwifery portion of the Report does not offer much that is new, and so of the general surgery part; but both are good. But as to the use of chloroform in medicine it is deficient, as this agent is most valuable in asthma, pain of gall-stones, tetanus, convulsions of children, whooping-cough, and a dozen other affections. There is at surgical operations now less arterial but more venous blood than formerly: even vomiting will fill a wound with blood (secondary). Chloroform is safe in what is termed shock or collapse. This is the "law of tolerance" so well described by Miller; but surgeons do not read of empirical rules so much as physiological experiments. The speaker fully agreed as to the great value of artificial respiration in accidents, but that was best set up by the electro-magnetism box, as now extensively tried. It is true also that resuscitation is more difficult in ether accident cases than from chloroform.

Dr. Hyde Salter said a point had been overlooked, but on which it was not possible for the committee to have investigated in so short a time as they had taken for their Report. It was as to the effect on the human constitution of chloroform administered for months or for years. He offered this as a suggestion for further investigation. Dr. Salter then related the case of a gentleman who for three years had taken chloroform nearly every night. The effects were somewhat like those of alcohol—general loss of nervous power, insomnia, and vomiting in the morning. The chloroform was taken for asthma, and sometimes as much as three ounces was inhaled in one night. The effect was most distressing; the patient lost appetite, became morose, and was unable to sleep. He for one month was able to avoid it, and the improvement was most marked; he got to sleep earlier and earlier every night. This, however, the patient ascribed to Indian hemp, which he took at the time; but on taking the chloroform again, he again had insomnia, and Indian hemp failed to help him. The vomiting in the morning was like that of drunkards. Dr. Salter considered that in other respects the effects would be found to resemble those of alcohol.

Mr. Savory asked under what circumstances and to what extent, in collapse from injuries or from hæmorrhage, chloroform might be administered. It was true that it would tend to diminish shock; but it would, on the other hand, be likely to render the pulse almost imperceptible. It was a point of great interest that chloroform tended to reduce the temperature, even, as some experiments showed, seven or eight degrees. In collapse, too, the temperature was diminished; and hence, if chloroform were given, there would be two conditions tending to the same result.

Dr. C. J. B. Williams said there could be but one opinion as to the great debt the Society owed to the committee,—a debt which the Society was scarcely able fully to appreciate until the publication of the Report. One important point was, however, settled,—that chloroform depressed the action of the heart. This was an important result, as it had been much disputed. It accorded with the results of experiments he himself had performed; and the histories of cases of death from chloroform all converged to the same point. This in itself helped to suggest methods of counteracting the effect of too large a dose. One obvions method was to add ether and alcohol to the chloroform. But there was no reason why alcohol, ammonia, or any other stimulant, should not be given by the mouth. Oxygen had been suggested, and had, it was said, been used in America with success; and it was not improbable that chloroform and oxygen might form a useful and safe combination. One class of anæsthetics had not been alluded to—namely, nitrous oxide. From his own observations some years ago, it appeared to be not so depressing, and it was safe. But there were difficulties in procuring it, and in applying it. Dr. Williams then alluded to the effect of chloroform on the blood, and asked what researches the committee had made in this part of the subject.

Dr. Kidd observed that two deaths were published this year from nitrous oxide used as an anæsthetic, so that it is not free from accident, as Dr. Williams might have supposed. As to the use of a little brandy or ammonia before administration, the plan was a good one, and always adopted by himself. Then as to the blood, it was perfectly known, from hundreds of experiments, that chloroform does not disturb its character at all. But it was not so with ether; here the corpuscles are destroyed, and the ether was so dissolved in the blood that it had been distilled over and over again from the blood of an animal deeply narcotized by it. Crystals were of less moment in blood long drawn. Forty-one deaths from ether had been published in America, and nineteen by Trousseau in France. It seemed paradoxical that chloroform administered in small doses should be dangerous. But it was small doses which produced convulsive vomiting; and so death in hospitals began as a sort of spasm or convulsive irritation of the fauces and glottis, while the patient was half conscious, not in deep coma; with a sort of reflex or tetanic rigidity of the respiratory muscles: the heart still beating actively, till overpowered or engorged at the right side. Hence the great value of artificial respiration. The breathing, in fact, stopped; and yet the patient did not inhale the large percentages given to animals, the chloroform at boiling-point in balloons, etc. It seemed paradoxical to deny physiological experiments, but we did not prevent glaucoma or ague by physiology, but rather by empirical rules; so was it with regard to chloroform and prevention of accidents. Oxygen, too, had been tried, but found wanting: the blood was not deoxygenized, at least by chloroform. Anæsthesia was like hybernation. The blood would not take up pure oxygen. In a case at a Borough hospital where oxygen was accurately tried, it proved useless. There was a fear that students trusted too much to a complex apparatus. They did not detect the danger early enough. To them "mixtures" like those of the new Pharmacopœia, would be a sort of mitigation of danger,—a kind of drag to the wheel of anæsthetic progress. Nor did the heart first stand still, as supposed by some; it was a popular error. While as to nitrous oxide, and even ether, they were both now given up in America, where they had been extensively administered.

Dr. Wynn Williams recommended that in collapse from chloroform warm port-wine should be injected by an O'Beirne's tube. He had tried this in collapses from other causes, and had found it to act energetically. It seemed, he thought, by increasing the warmth and by giving a stimulant at the same time, to meet Mr. Savory's remarks.

Dr. Ballard objected to that part of the Report in which the use of chloroform in the convulsion of children was recommended. He was satisfied that it had no beneficial effect, and asked if its use had been recommended after a trial in cases.

Mr. Curling said it was not recommended that chloroform should be given until reaction set in after injuries, but then it acted beneficially in the operation by diminishing shock. In reply to Dr. Ballard, he said that the recommendations of the committee were based on a series of facts, and after a large experience.

Dr. Harley said the action of chloroform on the corpuscles was but slight, but if ether were added, it dissolved the walls of the corpuscles. It had been long observed by Dr. Jackson, of New York, that chloroform produced formic acid in the system; but it was impossible to trace the changes. If blood were shaken up with ether, it would sometimes crystallize. Diseased blood would also sometimes crystallize spontaneously, while blood after slow death from chloroform, when shaken up with ether, always became like a mass of crystals.

(Dr. Harley then introduced to the notice of the Society an inhaler sent to him by Dr. Skinner, of Liverpool, and also an ingenious apparatus, invented by Dr. Squire, for measuring accurately the percentage of chloroform.)

Dr. Pearson said he was surprised to find that chloroform was more feared here than in Edinburgh, where it was invented. In Edinburgh apparatus was altogether disregarded. He felt certain that it was safer to give chloroform without an inhaler than with one.

Dr. Hyde Salter said that chloroform might be given so as to prevent pain and yet not produce insensibility; for this he could vouch, as he had experienced it himself. If, then, it could be discovered how to do this, it would not only lessen the risk, but would diminish the fear of the use of the drug.

Dr. Wright said that the inhaler had been used a year in Mr. Spencer Wells's ovariotomy operations, but it was liable to the objection that a good deal of the chloroform escaped, and thus affected the bystanders.

Mr. Birkett, one of the honorary secretaries, said that it had been impossible for him to read the whole of the abstract, but he had only omitted those parts which the reporters had agreed should be omitted.—*Lancet, July* 16, 1864.

ON BOILING WATER.

A Lecture delivered at the Royal Institution.

BY W. R. GROVE, ESQ., Q.C., F.R.S., M.R.I.

A paper by M. Donny ('Mémoires de l'Académie Royale de Bruxelles,' 1843) makes known the fact, that in proportion as water is deprived of air, the character of its ebullition changes, becoming more and more abrupt, and boiling like sulphuric acid with *soubresauts*, and that between each burst of vapour the water reaches a temperature above its boiling point. To effect this, it is necessary that the water be boiled in a tube with a narrow orifice, through which the vapour issues; if it be boiled in an open vessel, it continually reabsorbs air and boils in the ordinary way.

In my experiments on the decomposition of water by heat, I found that with the oxy-hydrogen gas given off from ignited platinum plunged into water, there was always a greater or less quantity of nitrogen mixed. This I could never entirely get rid of, and I was thus led into a more careful examination of the phenomenon of boiling water, and set before myself this problem,—what will be the effect of heat on water perfectly deprived of air or gas?

Two copper wires were placed parallel to each other through the neck of a Florence flask, so as nearly to touch the bottom; joining the lower ends of these was a fine platinum wire, about $1\frac{1}{2}$ inch long, and bent horizontally into a curve. Distilled water, which had been well boiled and cooled under the receiver of an air-pump, was poured into this flask so as to fill about one-fourth of its capacity. It was then placed under the receiver of an air-pump, and one of the copper wires brought in contact with a metallic plate covering the receiver, the other bent backwards over the neck of the flask, and its end made to rest on the pump-plate. By this means, when the terminal wires from a voltaic battery were made to touch, the one the upper and the other the lower plate, the platinum wire would be heated, and the boiling continued indefinitely in the vacuum of a very excellent air-pump. The effect was very curious; the water did not boil in the ordinary manner, but at intervals a burst of vapour took place, dashing the water against the sides of the flask, some escaping into the receiver. (There was a projection at the central orifice of the pump-plate to prevent this overflow getting into the exhausting tube.)

After each sudden burst of vapour, the water became perfectly tranquil, without a symptom of ebullition until the next burst took place. These sudden bursts occurred at measured intervals, so nearly equal in time, that, had it not been for the escape from the flask, at each burst, of a certain portion of water, the apparatus might have served as a timepiece.

This experiment, though instructive, did not definitely answer the question I had proposed, as I could not of course ascertain whether there was some minute residuum of gas which would form the nucleus for each ebullition; and I proceeded with others. A tube of glass, 5 feet long and $\frac{4}{10}$ths inch internal diameter, was bent into a V shape; into one end a loop of platinum wire was hermetically sealed with great care, and the portion of it in the interior of the tube was platinized. When the tube had been well washed, distilled water, which had been purged of air as before, was poured into it to the depth of 8 inches, and the rest of the tube filled with olive oil; when the V was inverted, the open end of the tube was placed in a vessel of olive oil, so that there would be 8 inches of water resting on the platinum wire, separated from the external air by a column of 4 feet 4 inches of oil. The projecting extremities of the platinum wire were now connected with the terminals of a voltaic battery and the water heated; some air was freed and ascended to the level of the tube—this was made to escape by carefully inverting the tube so as not to let the oil mix with the water—and the experiment continued. After a certain time the boiling assumed a uniform character, not by such sudden bursts as in the Florence-flask experiment, but with larger and more distinct bursts of ebullition than in its first boiling.

The object of platinizing the wire was to present more points for the ebullition, and to prevent *soubresauts* as much as possible.

The experiment was continued for many hours, and in some repetitions of it for days. After the boiling had assumed a uniform character, the progress of the vapour was carefully watched, and as each burst of vapour condensed in the oil, which was kept cool, it left a minute bead of gas, which ascended through the oil to the bend of the tube: a bubble was formed here which did not seem at all absorbed by the oil. This was analysed by a eudiometer, which I will presently describe, and proved to be nitrogen. The beads of gas, when viewed through a lens and micrometer scale at the same height in the tube, appeared as nearly as may be of the same size. No bubble of vapour was condensed completely, or without leaving this residual bubble. The experiment was frequently repeated, and continued until the water was so nearly boiled away, that the oil, when disturbed by the boiling, nearly touched the platinum wire; here it was necessarily stopped.

To avoid any question about the boiling being by electrical means, similar experiments were made with a tube, without a platinum wire, closed at its extremity, and the boiling was produced by a spirit-lamp. The effects were the same, but the experiment was more difficult and imperfect, as the bursts of vapour were more sudden, and the duration of the intervals more irregular.

The beads of gas were extremely minute, just visible to the naked eye, but were made visible to the audience by means of the electric lamp.

In these experiments there was no pure boiling of water, *i. e.* no rupture of cohesion of the molecules of water itself, but the water was boiled, to use M. Donny's expression, by evaporation against a surface of gas.

It is hardly conceivable that air could penetrate through such a column of oil, the more so as the oil did not perceptibly absorb the nitrogen freed by the boiling water and resting in the bend of the tube; but to meet this conjectural difficulty, the following experiment was made:—A tube, 1 foot long and $\frac{2}{10}$ths inch internal diameter, bent into a slight angle, had a bulb of $\frac{3}{4}$-inch diameter blown on it at the angle; this angle was about 3 inches from one end and 9 from the other; a loop of platinum wire was sealed into the shorter leg, and the whole tube and bulb filled with and immersed into mercury; water, distilled and purged of air as before, was allowed to fill the short leg, and by carefully adjusting the inclination, the water could be boiled so as to allow bubbles to ascend into the bulb and displace the mercury. The effect was the same as with the oil experiment, no ebullition without leaving a bead of gas; the gas collected in the bulb, and was cut off by what may be termed a valve of mercury, from the boiling water, then allowed to escape, and so on; the experiment was continued for many days, and the bubbles analysed from time to time; they proved, as before, to be nitrogen; and, as before, continued indefinitely.

A similar experiment was made without the platinum wire, and though, from the greater difficulties, the experiment was not so satisfactory, the result was the same.

As the mercury of the common barometer will keep air out of its vacuum for years, if not for centuries, there could be no absorption here from the external atmosphere, and I think I am fairly entitled to conclude from the above experiments—which I believe went far beyond any that have been recorded—that no one has yet seen the phenomenon of pure water boiling,—*i. e.* of the disruption of the liquid particles of the oxy-hydrogen compound so as to produce vapour which will, when condensed, become water, leaving no permanent gas. Possibly, in my experiment of the decomposition of water by ignited platinum, it may be that the sudden application of intense heat, and in some quantity, so forces asunder the molecules that, not having sufficient nitrogen dissolved to supply them with a nucleus for evaporation, the integral molecules are severed, and decomposition takes place. If this be so, and it seems to me by no means a far-fetched theory, there is probably no such thing as boiling, properly so called, and the effect of heat on liquids in which there is no dissolved gas may be to decompose them.

Considerations such as these led me to try the effect of boiling on an elementary liquid, and bromine occurred as the most promising one to work upon; as bromine could not be boiled in contact with water, oil, or mercury, the following plan was ultimately devised:—A tube, 4 feet long and $\frac{4}{10}$ths inch diameter, had a platinum hoop sealed into one closed extremity; bromine was poured into the tube to the height of 4 inches; the open end of the tube was then drawn out to a fine point by the blowpipe, leaving a small orifice; the bromine was then heated by a spirit-lamp; and when all the air was expelled, and a jet of bromine vapour issued from the point of the tube, it was sealed by the blow-pipe. There was then, when the bromine vapour had condensed, a vacuum in the tube above the bromine. The platinum loop was now heated by a voltaic battery, and the bromine boiled: this was continued for some time, care being taken that the boiling should not be too violent. At the end of a certain period—from half an hour to an hour—the platinum loop gave way, being corroded by the bromine; the quantity of this had slightly decreased. On breaking off, under water, the point of the tube, the water mounted and showed a notable quantity of permanent gas, which on analysis proved to be pure oxygen. As much as a quarter of a cubic inch was collected at one experiment. The platinum wire, which had severed at the middle, was covered with a slight black crust, which, suspecting to be carbon, I ignited by a voltaic spark in oxygen in a small tube over lime-water; it seemed to give a slight opalescence to the liquid, but the quantity was so small that the experiment was not to be relied on. No definite change was perceptible in the bromine; it seemed to be a little darker in colour and had a few black specks floating in it, which I judged to be minute portions of the same crust which had formed on the platinum wire, and which had become detached.

The experiment was repeated with chloride of iodine and with the same result, except that the quantity of oxygen was greater: I collected as much as half a cubic inch in some experiments, from an equal quantity of chloride of iodine; the platinum wire, however, was more quickly acted on than with the bromine, and the glass of the tube around it to some extent.

Melted phosphorus was exposed to the heat of the voltaic disruptive discharge by taking this between platinum points in a tube of phosphorus, similarly to an experiment of Davy's, but with better means of experimenting; a considerable quantity of phosphuretted hydrogen was given off, amounting in several experiments to more than a cubic inch.

A similar experiment was made with melted sulphur, and sulphuretted hydrogen was given off, but not in such quantities as the phosphuretted hydrogen. I tried in vain to carry on these experiments beyond a certain point; the substance became pasty, mixed with platinum from the arc, and from the difficulty of working with the same freedom as when they were fresh, the glass tubes were always broken after a certain time. Had I time for working on the subject now, I should use the discharge from the Ruhmkorf coil, which had not been invented at the period of these experiments. At a subsequent period, when this discharge was taken in the vacuous receiver of an air-pump from a metallic point to a metallic capsule containing phosphorus, a considerable yellow deposit lined the receiver, which, on testing, turned out to be allotropic phosphorus. No gas is, however, given off. I had an air-pump (described Phil. Trans., 1852, p. 101) which enabled me to detect very small quantities of gas, but I could get none. It was in making these experiments that I first detected the striæ in the electric discharge, which have since become a subject of such interesting observations, which are seen, perhaps, more beautifully in this phosphorus vapour than in any other medium, and which cease, or become very feeble, where the allotropic phosphorus is not produced.

I tried also phosphorus highly heated by a burning-glass in an atmosphere of nitrogen, but could eliminate no perceptible quantity of gas, though the phosphorus was changed into the allotropic form.

It is not difficult to understand why gas is not perceptibly eliminated in the last two experiments; the effect is probably similar to that described in my paper on the "Decomposition of Water by Heat," where, when the arc or electric spark is taken in aqueous vapour, a minute bubble of oxyhydrogen gas is freed and disseminated through the vapour, recombination being probably prevented by this dilution; but, however long the experiment may be continued, no increased quantity of the gas is obtained, all beyond this minute quantity being recombined. If, however, the bubble of gas be collected, by allowing the vapour to cool, and then expelled, a fresh portion is decomposed, and so on.

So with the phosphorus in the experiments in the air-pump and with the burning-glass; if any gas is liberated it is probably immediately recombined with the phosphorus; possibly a minute residuum might escape recombination, but the circumstances of the experiment did not admit of this being collected, as the gas was with the aqueous vapour.

When, on the other hand, the gas freed is immediately cut off from the source of heat, as when the spark is taken in liquids, an indefinite quantity can be obtained.

Decomposition and the elimination of gas may thus take place by the application of intense heat to a point in a liquid, or also in gas or vapours; but, in the latter case, it is more likely to be masked by the quantity of gas or vapour through which it is disseminated.

I believe there are very few gases in which some alteration does not take place by the application of the intense heat of the voltaic arc or electric spark. If the arc be taken between platinum points in dry oxygen gas over mercury, the gas diminishes indefinitely, until the mercury rises, and by reaching the point where the arc takes place, puts an end to the experiment. I have caused as much as a cubic inch of oxygen to disappear by this means. I at one time thought this was due to the oxidation of the platinum; but the high heat renders this improbable, and the deposit formed on the interior of the glass tube in which the experiment is made has all the properties of platinum-black; so if the spark from a Ruhmkorf coil be taken in the vapour of water for several days, a portion of gas is freed which is pure hydrogen, the oxygen freed being probably changed into ozone, and dissolved by the water in this case, while in the former it combined with the mercury.

I have alluded to the eudiometer by which I analysed the gases obtained in these experiments; it was formed simply of a tube of glass, frequently not above $2\frac{1}{2}$ millimetres in diameter, with a loop of wire hermetically sealed into one end, the other having an open bell-mouth. By a platinum wire a small bubble of the gas to be examined could be got up through water or mercury into the closed end of the tube, and by the addition of a bubble of oxygen or hydrogen gas, a very accurate analysis of very minute quantities of gas could be made: I have analysed by this means quantities no larger than a partridge-shot.

I need hardly allude to results on the compound liquids, such as oils and hydrocarbons, as the fact that permanent gas is given off in boiling such liquids would not be unexpected; but the above experiments seem to show that boiling is by no means necessarily the phenomenon that has generally been supposed, viz. a separation of cohesion in the molecules of a liquid from distension by heat. I believe, from the close investigation I made into the subject, that (except with the metals, on which there is no evidence) no one has seen the phenomenon of pure boiling without permanent gas being freed, and that what is ordinarily termed boiling arises from the extrication of a bubble of permanent gas either by chemical decomposition of the liquid, or by the separation of some gas associated in minute quantity with the liquid, and from which human means have hitherto failed to purge it; this bubble once extricated, the vapour of the liquid expands it, or, to use the appropriate phrase of M. Donny, the liquid evaporates against the surface of the gas.

My experiments are, in a certain sense, the complement of his. He showed that the temperature of the boiling point was raised in some proportion as water was deprived of air, and that under such circumstances the boiling took place by *soubresauts*. I have, I trust, shown that when the vapour liberated by boiling is allowed to condense, it does not altogether collapse into a liquid, but leaves a residual bubble of permanent gas, and that at a certain point this evolution becomes uniform.

Boiling, then, is not the result of merely raising a liquid to a given temperature, it is something much more complex.

One might suppose that with a compound liquid the initial bubble by which evaporation is enabled to take place might, if all foreign gas were or could be extracted, be formed by decomposition of the liquid; but this could not be the case with an elementary liquid; whence the oxygen from bromine or the hydrogen from phosphorus and sulphur? As with the nitrogen in water, it may be that a minute portion of oxygen, hydrogen, or of water, is inseparable from these substances, and that if boiled away to absolute dryness, a minute portion of gas would be left for each ebullition.

With water there seems a point at which the temperature of ebullition and the quantity of nitrogen yielded become uniform, though the latter is excessively minute.

The circumstances of the experiments with bromine, phosphorus, and sulphur, did not permit me to push the experiment so far as was done with water, but as far as it went the result was similar.

When an intense heat, such as that from the electric spark or voltaic arc, is applied to permanent gas, there are, in the greater number of cases, signs either of chemical decomposition or of molecular change; thus compound gases, such as hydrocarbons, ammonia, the oxides of nitrogen, and many others, are decomposed. Phosphorus in vapour is changed to allotropic phosphorus, oxygen to ozone, which, according to present experience, may be viewed as allotropic oxygen. There may be many cases where, as with aqueous vapour, a small portion only is decomposed, and this may be so masked by the volume of undecomposed gas as to escape detection; if, for instance, the vapour of water were incondensable, the fact that a portion of it is decomposed by the electric spark or ignited platinum would not have been observed.

All these facts show that the effect of intense heat applied to liquids and gases is much less simple, and presents greater interest to the chemist, than has generally been supposed. In far the greater number of cases, possibly in all, it is not mere expansion into vapour which is produced by intense heat, but there is a chemical or molecular change. Had circumstances permitted I should have carried these experiments further, and endeavoured to find an *experimentum crucis* on the subject. There are difficulties with such substances as bromine, phosphorus, etc., arising from their action on the substances used to contain and heat them, which are not easy to vanquish, and those who may feel inclined to repeat my experiments will find these difficulties greater than they appear in narration; but I do not think they are insuperable, and hope that, in the hands of those who are fortunate enough to have time at their disposal, they may be overcome.

To completely isolate a substance from the surrounding air, and yet be able to experiment on it, is far more difficult than is generally supposed. The air-pump is but a rude mode for such experiments as are here detailed.

Caoutchouc joints are out of the question; even platinum wires carefully sealed into glass, though, as far as I have been able to observe, forming a joint which will not allow gas to pass, yet it is one through which liquids will effect a passage, at all events when the wires are repeatedly heated.

In some experiments with the ignited platinum-wire hermetically sealed into a tube of glass, the end of the tube containing the platinum wire was placed in a larger tube of oil, to lessen the risk of cracking the glass. After some days' experimenting, though the sealing remained perfect, a slight portion of carbon was found in the interior liquid. This does not affect the results of my experiments, as I repeated them with glass tubes closed at the end and without platinum wires, and also without the oil-bath; but it shows how difficult it is to exclude sources of error. When water has been deprived of air to the greatest practicable extent, it becomes very avid for air. The following experiment is an instance of this:—A single pair of the gas-battery, the liquid in which was cut off from the external air by a greased glass stopper, having one tube filled with water, the other with hydrogen, the platinized platinum plates in each of these tubes were connected with a galvanometer, and a deflection took place from the reaction of the hydrogen on the air dissolved in the water. After a time the deflection abated, and the needle returned to zero, all the oxygen of the air having become combined with the hydrogen. If now the stopper were taken out, a deflection of the galvanometric needle immediately took place, showing that the air rapidly enters the water, as water would a sponge. Absolute chemical purity in the ingredients is a matter, for refined experiments, almost unattainable; the more delicate the test, the more some minute residual product is detected; it would seem (to put the proposition in a somewhat exaggerated form) that in nature everything is to be found in anything if we carefully look for it.

I have indicated the above sources of error to show the close pursuit that is necessary when looking for these minute residual phenomena. Enough has, I trust, been shown in the above experiments to lead to the conclusion that, hitherto, simple boiling, in the sense of a liquid being expanded by heat into its vapour without being decomposed or having permanent gas eliminated from it, is a thing unknown. Whether such boiling *can* take place may be regarded as an open question, though I incline to think it cannot; that if water, for instance, could be absolutely deprived of nitrogen, it would not boil until some portion of it was decomposed; that the physical severance of the molecules by heat is also a chemical severance. If there be anything in this theoretic view, there is great promise of important results on elementary liquids, if the difficulties to which I have alluded can be got over.

The constant appearance of nitrogen in water, when boiled off out of contact with the air almost to the last drop, is a matter well worthy of investigation. I will not speculate on what possible chemical connection there may be between air and water; the preponderance of these two substances on the surface of our planet, and the probability that nitrogen is not the inert diluent in respiration that is generally supposed, might give rise to not irrational conjectures on some unknown bond between air and water. But it would be rash to announce any theory on such a subject; better to test any guess one may make, by experiment, than to mislead by theory without sufficient data, or to lessen the value of facts by connecting them with erroneous hypotheses.

GUN-COTTON.

BY JOHN SCOTT RUSSELL, C.E., F.R.S.

The elements are proverbially good servants, but bad masters—Fire, water, wind, and steam are fierce demons when they get the upper hand; yet what would civilization be, wanting the fire of the kitchen, the smith's hearth, and the foundry; how should we be, without seas to carry our boats or rivers to turn our mills? Commerce and merchandise are mainly conducted by the wind and the sails of our merchantmen; and steam clothes us, and carries us from city to farm, and from island to continent; yet the earthquake, the volcano, the conflagration, the torrent, the storm, the hurricane, and the explosion —what are they but servants become masters?

It is peculiarly true of steam and gunpowder that they are among the most useful and most dangerous of human inventions; but danger in both is generally admitted to be a matter merely of skill and care. No one proposes to put down railways because a locomotive explodes, or to give up shooting because a gun has burst, or a gunpowder manufactory blown up.

Gun-cotton is a new power coming under the same category as steam and gunpowder. It is highly dangerous to those who do not possess the necessary knowledge and skill;

but, like them, it enormously extends human power, and, like them, the skill to use it can be rightly and certainly acquired.

The object of this paper is to extend the knowledge and skill of my countrymen in the use of this new power. It is, I believe, of far more value to England than to any other nation in the world. It is, in my opinion, a power capable of being extensively used for a multitude of purposes yet unheard of; and I believe it will play an important part in the destinies of England.

The first question we naturally ask on the introduction of a new power is, what are to be its advantages over existing powers and processes? In regard to gun-cotton, we at once ask, therefore, what are its advantages over gunpowder? Is it stronger? Is it more convenient? Is it cheaper? Why should we give up gunpowder and take to gun-cotton? The answers to these questions categorically will best introduce it to the English reader.

I. Is gun-cotton stronger than gunpowder? The answer to this is, Yes, sixfold stronger.

By this we mean that if we take a given weight of gun-cotton, say four ounces, if we bore a hole $1\frac{1}{2}$ inch in diameter and 3 feet deep, into hard rock or slate, in a quarry, and put 4 ounces of gun-cotton into it, it will occupy about 1 foot of its length, and the aperture being closed in the usual manner, and a matchline led from the charge to the proper distance from which to fire it; and if we next take 24 ounces of best gunpowder, bore a similar hole, and charge it similarly with gunpowder, and close it in the same way; it has been found that, on these being exploded, the 4 ounces of gun-cotton have produced greater effect, in separating the rock into pieces, than the 24 ounces of gunpowder. The answer is, therefore, that in disruptive explosion the strength of gun-cotton is sixfold that of good gunpowder.

But the disruptive or bursting power of gunpowder is not always the quality for which we value it most, nor the service we require of it. In mining rocks, in exploding shells, in blowing up fortresses, this property is what we value, and this work is what we require. But we do not want to burst our fowling-pieces, our rifles, our cannon. On the contrary, we want to use a force that shall project the projectile out of the gun without bursting the gun, without straining the gun beyond a given moderate limit, which it shall be able to endure. We want therefore a service from gun-cotton which shall be the contrary of destructive to, or disruptive of, the chamber in which it does the work of giving motion to the projectile.

This moderated and modified work, gun-cotton can also perform; and it is the modern discovery of General Lenk which has enabled us to moderate and modify gun-cotton to this gentler service. He discovered how to organize, arrange, and dispose mechanically of gun-cotton in such a way that it should be three times stronger than gunpowder. Accordingly, one of his charges of gun-cotton, weighing 16 ounces, projected a 12-pound solid round shot with a speed of 1426 feet a second, while a charge of gunpowder of 49 ounces gave the same shot a speed of 1400 feet a second. One-third of the weight of gun-cotton exceeded, therefore, the threefold weight of gunpowder in useful effect.

II. Is gun-cotton more convenient than gunpowder? This is a larger and more various question than the former, and divides itself into various subdivisions.

It is well known to sportsmen, to soldiers, to artillery-men, that gunpowder fouls a gun. A foul residue of soot, sulphur, and potash soils the inside of the gun after every charge. The gun must, somehow, be cleaned after a discharge; if not, it fires worse, recoils more, and ceases to do its best. If the gun be a breech-loading gun, its mechanism is dirted, and works less easily. Gun-cotton deposits no residue, leaves the gun clean and clear, and the utmost it does is to leave a gentle dew of clear water on the inside of the bore, this water being the condensed steam which forms one of the products of its decomposition. Gun-cotton is, therefore, superior to gunpowder in not fouling the gun, —a result favourable both to quicker and more accurate firing.

It is further a matter of no slight convenience that gun-cotton makes no smoke. In mines the smoke of gunpowder makes the air unbreathable, and for some time after explosion the miners cannot return to their work. In boring the great tunnel of Mont Cenis through the Alps, the delay from smoke of powder alone will postpone the opening of the line for many months. After a properly-conducted explosion of gun-cotton, the workmen may proceed in their work at once without inconvenience.

In casemates of fortresses, gunpowder fills the casemates with foul smoke, and the men speedily sink under the exertion of quick firing. By using gun-cotton it was ascertained that the men could continue their work unharmed for double the quantity of firing. This is partly attributed to the greater heat, and partly to the foulness of the air produced by gunpowder.

But it is under the decks of our men-of-war that greatest benefit is likely to arise from gun-cotton. Not only does the smoke of a broadside fill the between decks with hot and foul air, but the smoke of the windward gun blinds the sight, and hinders the aim of the leeward. When there is no smoke, as with gun-cotton, the aim of every gun may be precise and deliberate. The diminished heat between decks will also tell powerfully in favour of gun-cotton. In our armour-plated ships also there is more value in breech-loading guns than in any other use of artillery. It is one of the necessities of breech-loading mechanism, that it be kept clean, and nothing tends more to derange its perfect action than the greater heat which gunpowder imparts to the gun from which it is fired.

That gun-cotton has the convenience of not heating the gun has been thus proved:—100 rounds were fired in 34 minutes with gun-cotton, and the temperature of the gun was raised 90°. 100 rounds were fired with gunpowder, and triple the time allowed to cool the gun, which nevertheless was heated so much as to evaporate water with a hissing sound, which indicated that its temperature was much above 212°. Under these circumstances the firing with gunpowder had to be stopped, while that with gun-cotton was comfortably continued to 180 rounds.

It is also a matter of practical convenience that gun-cotton, insomuch as it is lighter, can be carried more easily and farther than gunpowder; and it may be wetted without danger, so that when dried again in the open air, it is as good for use as before.

III. We have now to ask—is it cheaper? The answer to this question must be qualified—pound for pound it is dearer; we must therefore judge of its cheapness by its effect, not by weight merely. But where it does six times as much work, it can then be used at six times the price per pound and still be as cheap as gunpowder. As far as we yet know, the prices of gun-cotton and gunpowder are nearly equal, and it is only therefore where the one has advantages and conveniences beyond the other, and is more especially suited for some specific purpose, that it will have the preference. Effective cheapness will therefore depend mainly on which of the two does best the particular kind of duty required of it.

To illustrate how curiously these two powers, gun-cotton and gunpowder, differ in their nature, and how the action of gun-cotton may be changed by mechanical arrangements, we may take one kind of work that is required of both:—If a General want to blow open the gates of a city, he orders an enterprising party to steal up to the gate, with a bag containing 100 lbs. of gunpowder, which he nails to the gate, and by a proper match-line he fires the gunpowder and bursts open the gate. If he nailed a bag of gun-cotton of equal weight in the same place and fired it, the gun-cotton would fail, and the gate would be uninjured, although the 100 lbs. of gun-cotton is sixfold more powerful than the gunpowder. Here, then, gunpowder has the advantage—both weight and effect considered.

But the fault here lies not in the gun-cotton, but the way of using it. If instead of 100 lbs. of gun-cotton in a bag, 25 lbs. had been taken in a proper box made for this purpose, and simply laid down near the gate, and not even nailed to it, this 25 lbs. would shiver the gate into splinters. The bag which suits the powder happens not to suit the gun-cotton.

Gun-cotton is therefore a power of a totally different nature from gunpowder, and requires complete study to know its nature and understand its use. It appears that both gunpowder and gun-cotton have special qualities, and may be peculiarly suited for peculiar uses. It is the duty of a wise people to make use of both to the ends they each suit best, without prejudice arising from the accident of novelty or antiquity.

The nature of gun-cotton requires a double study, chemical and mechanical. It is not like steam, the same substance, whether in the form of ice or water or steam. It is one substance when as gun-cotton it enters the gun, and quite a different one when it has exploded and leaves the gun. Not only are the solids which enter converted into gas, but they form totally new combinations and substances. So that the marvellous changes which the chemist effects by the magic of his art take place in an instant of time, and during that almost inconceivably minute period of time, in a laboratory intensely heated, old substances are dissolved, their material atoms are redistributed, each atom released selects by natural affinity a new partner, these new unions are cemented, and at the end of this prolific instant totally new combinations of matter, forming what we call new substances, issue from the gun. It so happens that of these new substances, formed out of gun-cotton, all are pure transparent gases, while in the case of gunpowder there remain 68 per cent. of solid residue, and only 32 per cent. are pure gases.

It is to chemistry, however, that we must look for full and authentic information as to these wonderful changes; first, from the innocent, gentle cotton-wool in which our wives and daughters wrap their jewels for soft keeping, into the terrible and irresistible compound of nitric acid and cotton fibre which forms tri-nitro-cellulose, the chemical name of gun-cotton. Chemistry must also tell us how tri-nitro-cellulose is to be turned by heat into transparent explosive gases of such tremendous power.

In short, chemistry has to supply us with the new material, and it is to the science of mechanics that we must look for inventions, of the best way to manipulate and apply it to use for doing the practical work we set it to, in the most effectual, convenient, and economical way.

The chemistry of gun-cotton is therefore the first part of our study of this power, and the mechanics of gun-cotton forms the second.

I. The Chemistry of Gun-Cotton.*

Although gun-cotton was discovered eighteen years ago by one of the first chemists of the day, Professor Schönbein, and researches on its nature and preparation were almost immediately instituted in this country by Porrett, Teschemacher, Taylor, Gladstone, and others, no accurate knowledge of the true constitution and chemical nature of this important material was obtained until Hadow, an English chemist, published in 1854 the result of some valuable investigations by which the mode of formation and composition of gun-cotton were conclusively established.

Cotton, or cellulose as it is termed by chemists, is built up of a certain number of atoms of carbon, oxygen, and hydrogen. Chemistry is scarcely yet able to point out how these atoms are probably arranged; but there appears to be no doubt that some of the elementary particles are so intimately connected with the very existence of cotton, that they cannot be displaced or removed without destroying the very existence of the substance; whilst other atoms, on the contrary, are more loosely held together, and are gifted with a certain mobility which enables them to be taken out altogether without materially altering the outward physical character of the cotton, provided the spaces which these atoms would leave vacant are immediately filled up by certain other atoms. Now, without entering into the details of chemical formulæ, which would neither interest our readers nor render our meaning more intelligible, we may briefly say that, in ordinary cotton, three atoms of the hydrogen (of which there are ten altogether) are in this loose state of combination, and may be removed and their places filled up by a compound atom of *hyponitric acid*, without so far altering the character of the substance as to render the name of cotton inapplicable to it. It may be just mentioned in passing, that it is not necessary that the whole three atoms of hydrogen should be taken out and their places filled up by hyponitric acid; only one or two of them may be so replaced, but as these are inferior for explosive purposes (although of great use to photographers, inasmuch as when dissolved in ether they form collodion), we need only direct our attention to the compound with the highest displacement. From its explosiveness and consequent similarity to gun-*powder*, this has been called gun-*cotton*. In scientific language, following the excellent custom adopted by chemists in the nomenclature of organic compounds, a name has been given to it which fully expresses its composition: *cellulose* being the scientific name for cotton, and the prefix *nitro* being added when any of the hydrogen in an organic compound is replaced by hyponitric acid (by no means an uncommon occurrence in organic chemistry), chemists call the product in this instance *tri-nitro-cellulose*, signifying that it is cellulose, in which three equivalents of the hydrogen are replaced by nitrous acid. It is also sometimes called *pyroxylin*, under the impression, we suppose, that by translating a useful English term into barbarous Greek it becomes scientific. This system of pseudo-scientific nomenclature is, unfortunately, too

* For this portion of my paper I am indebted to the kindness of Mr. Wm. Crookes, F.R.S.

common. If an expressive, convenient, but empirical name be desired, by all means let us have the common English name in popular use. If, on the other hand, a scientific term be required, let us, in the name of all that is scientific, build up this name according to the orthodox rules of science; but we protest against a name like pyroxylin, which leads to nothing but the inference that science is not indigenous to the soil of England.

Most European governments have attempted to utilize gun-cotton in warfare. Soon after its discovery, Messrs. Hall, the well-known gunpowder makers at Faversham, commenced its manufacture upon a considerable scale; their factory had, however, not been long in operation before a very disastrous explosion occurred, by which a number of men lost their lives, and this was ascribed to the spontaneous ignition of the gun-cotton: the manufacture was therefore abandoned in England.

As early as the winter of 1846 a French manufactory was established at the Government powder-works at Bouchet, near Paris, and much valuable information was obtained respecting the comparative value of gun-cotton and gunpowder; but three disastrous explosions occurring within a year (one taking place in a magazine near which it was believed that no one had been for several days) put a stop, until quite recently, to further experiments.

In Austria, experiments were likewise instituted, and although the committee of the German Confederation pronounced unfavourably upon it, one of the members, General Lenk, devoted himself assiduously to its study, and with such success that the Austrian Government were induced to reconsider their adverse determination. The manufacture was commenced upon a large scale, and above forty batteries of guns were furnished with this agent, and successfully used. The complete supersession of gunpowder by gun-cotton was considered certain, when an explosion, which took place at the Austrian gun-cotton magazines at Limering, again put a stop (to some extent) to its use in artillery. Another Austrian committee, however, reported so favourably on its value, stability, and non-liability to spontaneous explosion, that gun-cotton was again restored to favour.

The very favourable accounts respecting the value of gun-cotton for warlike purposes, which were from time to time received by our government, led to experiments on a considerable scale in this country. The manufacture of this agent is now in full operation both at the Government powder-works at Waltham Abbey, and also at a large private manufactory at Stowmarket.

The great danger in the case of the early gun-cotton was its liability to spontaneous explosion, and whilst there remained the slightest suspicion of such a possibility, its employment for war puposes was out of the question. The investigations of General Lenk have shown that this accident is due to imperfect preparation, and that by adopting the precautions which he has pointed out, its spontaneous ignition is impossible. It has been very clearly established that the lower nitro-compounds of cellulose,—that is, cotton in which only one or two atoms of hydrogen are replaced by hyponitric acid, are much more easily decomposed than the compound in which the replacement has proceeded to its fullest extent. Tri-nitro-cellulose, or true gun-cotton, is a remarkably stable compound under all possible atmospheric conditions; but it is by no means easy to ensure the complete conversion of cotton into this body, and it has been shown to be in the highest degree probable that the explosions which put a stop to the early attempts at utilizing gun-cotton were due to its incomplete conversion. The directions given by Schönbein, although successful on the small scale, fail when tried with large quantities, and to General Lenk is due the credit of devising a process of manufacture which gives an absolutely uniform and true chemical compound when working on the largest scale. Ordinary gun-cotton is generally made by saturating cotton-wool with a mixture of one part of concentrated nitric acid and three parts of oil of vitriol, and allowing the mixture to stand at rest for one hour; it is then thoroughly washed and allowed to dry in the air. This process is tolerably successful when only about half-an-ounce of cotton is treated at one time, but it is found to be ineffectual in making a uniform and safe material for war purposes. The most important of the precautions recommended by General Lenk are, the cleansing and perfect desiccation of the cotton as a preliminary to its immersion in the acids; the employment of the strongest acids obtainable in commerce; the steeping of the cotton in a strong mixture of acids after its first immersion and its partial conversion into gun-cotton; the continuance of the steeping for forty-eight hours; and the thorough purification of the gun-cotton so produced from every trace of free acid: this is secured by its being washed in a stream of water for several weeks. Subsequently a weak solution of potash may be used, but this is not essential. The prolonged continuance of these processes, which would appear superfluous at first sight, is really essential, when we consider that each cotton fibre is a long, narrow tube, often twisted and even doubled up, and the acid has first to penetrate into the very farthest depths of these tubes, and has afterwards to be soaked out of them. Hence the necessity of time.

It appears that gun-cotton, prepared in this manner, is a true chemical compound, and is not liable to the objections which have been urged against that mixture of compounds which has been usually employed in experiments. The advantages which it possesses may be classed as follows :—

1. It is of uniform composition, and thus the force of the gases generated on explosion may be accurately estimated.

2. It will not ignite till raised to a temperature of 300° F. (as a rule, the temperature must be raised much higher). This is considerably lower than the igniting point of gunpowder, but, being much above the heat of boiling water, it can only occur when artificially produced by means which would render gunpowder itself liable to ignition.

3. It is almost absolutely free from ash when exploded under pressure in a confined space.

4. It has a very marked superiority in stability over other forms of gun-cotton, having been kept unaltered for fifteen years.

One great advantage which gun-cotton possesses over gunpowder, and which ought to have considerable weight in any discussion of their comparative uses for national purposes, is, that gun-cotton is unaffected by water. Gunpowder in a damp atmosphere will soon be completely spoiled, and it cannot afterwards be restored to a serviceable condition without being again submitted to the processes of manufacture, starting almost from the commencement. Gun-cotton, on the contrary, although it gets damp in a moist atmosphere, rapidly returns to its ordinary state when exposed to air of average dryness. Complete immersion in water for an indefinite period has no injurious action on it, for when afterwards dried by exposure to the air, it is as good as ever. The absolute safety which this property would confer upon the magazines of forts and ships cannot be too highly urged ; the explosive material could be kept permanently in tanks full of water, in which case a lighted candle or even a red-hot shot would be a harmless visitant. When required for action, a centrifugal drying-machine and a hot-water closet would supply the combatants with any quantity at a few hours' notice.

When gun-cotton is ignited in a close vessel, such as a shell or the chamber of a gun, it is at once converted into certain gases, the principal being carbonic oxide, carbonic acid, nitrogen, light carburetted hydrogen, hydrogen, and steam. The introduction of the hyponitric acid, a compound containing a large excess of oxygen, gives to the cotton a sufficient amount of this gas to reduce it completely to the state of vapour ; but although only gases are produced, there is not enough oxygen for their complete combustion. About 40 per cent. are inflammable, and produce a bright flash when they emerge into the air from the mouth of the gun.

II.—The Mechanics of Gun-Cotton.

The mechanical application of gun-cotton may be considered to be due exclusively to Major-General Lenk, of the Austrian service. Pure gun-cotton becomes either a powerful explosive agent, or a docile performer of mechanical duty, not according to any change in its composition, or variation in its elements or their proportions, but according to the mechanical structure which is given to it, or the mechanical arrangements of which it is made a part. It was General Lenk who discovered that structure was quality, and mechanical arrangement the measure of power, in gun-cotton ; and in his hands, a given quantity of the same cotton becomes a mild, harmless, ineffectual firework, a terrible, irresistible, explosive agent, or a pliable, powerful, obedient workman.

The first form which General Lenk bestowed on gun-cotton was that of a continuous yarn or spun thread. Gunpowder is carefully made into round grains of a specific size. Gun-cotton is simply a long thread of cotton fibre, systematically spun into a yarn of given weight per yard, of given tension, of given specific weight. A hank of a given length is reeled, just like a hank of cotton-yarn to be made into cloth, and in this state gun-cotton yarn is bought and sold like any other article of commerce.

This cotton-yarn converted into gun-cotton may be called, therefore, the raw material of commerce. In this form it is not at all explosive in the common sense of the word. You may set fire to a hank of it, and it will burn rapidly with a large flame; but if you yourself keep out of the reach of the flame, and keep other combustibles beyond reach, no harm will happen, and no explosion or concussion will result. If you lay a long thread of it round your garden-walk at night, disposing it in a waving line with large balls of gun-cotton thread at intervals, and light one end of the thread, it will form a beautiful firework, the slow lambent flame creeping along with a will-o'-th'-wisp-looking light, only with a measured speed of 6 inches per second, or 30 feet a minute; the wind hastening it or retarding it as it blows with or against the line of the thread. This is the best way to commence an acquaintance with this interesting agent.

Care must be taken not to become too familiar with gun-cotton even in this harmless and playful guise; cotton dresses will readily catch fire from it, and it should not be treated with less care to keep fire from it than gunpowder. In one respect it is less liable to cause danger than gunpowder. Grains of powder are easily dropped through a crevice, and may be sprinkled about in a scarcely noticeable form; but a hank of gun-cotton is a unit, which hangs together and cannot strew itself about by accident.

The *second* form of gun-cotton is an arrangement compounded out of the elementary yarn. It resembles the plaited cover of a riding-whip; it is plaited round a core or centre which is hollow. In this form it is match-line, and, although formed merely of the yarn plaited into a round hollow cord, this mechanical arrangement has at once conferred on it the quality of speed. Instead of travelling as before only 6 inches a second, it now travels 6 feet a second.

The *third* step in mechanical arrangement is to enclose this cord in a close outer skin or coating, made generally of India-rubber cloth, and in this shape it forms a kind of match-line, that will carry fire at a speed of from 20 to 30 feet per second.

It is not easy to gather from these changes what is the cause which so completely changes the nature of the raw cotton by mechanical arrangement alone. Why a straight cotton thread should burn with a slow creeping motion when laid out straight, and with a rapid one when wound round in a cord, and again much faster when closed in from the air, is far from obvious at first sight; but the facts being so, deserve mature consideration.

The cartridge of a common rifle in gun-cotton is nothing more than a piece of match-line in the second form enclosed in a stout paper-tube, to prevent it being rammed down like powder. The ramming down, which is essential to the effective action of gunpowder, is fatal to that of gun-cotton. To get useful work out of a gun-cotton rifle, the shot must on no account be rammed down, but simply transferred to its place. Air left in a gunpowder barrel is often supposed to burst the gun; in a gun-cotton barrel, it only mitigates the effect of the charge. The object of enclosing the gun-cotton charge in a hard strong pasteboard cartridge, is to keep the cotton from compression and give it room to do its work.

It is a *fourth* discovery of General Lenk, that to enable gun-cotton to perform its work in artillery practice, the one thing to be done is to "give it room." Don't press it together—don't cram it into small bulk; give it at least as much room as gunpowder in the gun, even though there be only one-third or one-fourth of the quantity (measured by weight). 1 lb. of gun-cotton will carry a shot as far as 3 or 4 lbs. of gunpowder; but that pound should have at least a space of 160 cubic inches in which to work.

This law rules the practical application of gun-cotton to artillery. A cartridge must not be compact, it must be spread out or expanded to the full room it requires. For this purpose, a hollow space is preserved in the centre of the cartridge by some means or other. The best means is to use a hollow thin wooden tube to form a core; this tube should be as long as to leave a sufficient space behind the shot for the gun-cotton. On this long core the simple cotton yarn is wound round like thread on a bobbin, and sufficiently thick to fill the chamber of the gun; indeed, a lady's bobbin of cotton thread is the innocent type of the most destructive power of modern times—only the wood in the bobbin must be small in quantity in proportion to the gun-cotton in the charge. There is no other precaution requisite except to enclose the whole in the usual flannel bag.

The artillerist who uses gun-cotton has therefore a tolerably simple task to perform if he merely wants gun-cotton to do the duty of gunpowder. He has only to occupy the same space as the gunpowder with one-fourth of the weight of gun-cotton made up in the bobbin as described, and he will fire the same shot at the same speed. This is speaking in a general way, for it may require in some guns as much as $\frac{1}{3}$ of the weight of gunpowder and $\frac{11}{10}$ the bulk of charge to do the same work; a little experience will settle the exact point, and greater experience may enable the gun-cotton to exceed the performance of the gunpowder in every way.

The *fifth principle* in the use of gun-cotton is that involved in its application to bursting uses. The miner wants the stratum of coal torn from its bed, or the fragment of ore riven from its lair; the civil engineer wishes to remove a mountain of stone out of the way of a locomotive engine; and the military engineer to drive his way into the fortress of an enemy, or to destroy the obstacles purposely laid in his way. This is a new phase of duty for gun-cotton—it is the work of direct destruction. In artillery you do not want to destroy directly, but indirectly. You don't want to burst your gun, nor even to injure it; and, we have seen, in order to secure this, you have only to give it room.

The fifth principle therefore is, to make it destructive—to cause it to shatter everything to pieces which it touches, and for this purpose you have only to deprive it of room. Give it room, and it is obedient; imprison it, and it rebels. Shut up without room, there is nothing tough enough or strong enough to stand against it.

To carry this into effect, the densest kind of gun-cotton must be used. It must no longer consist of fine threads or hollow textures wound on roomy cores. All you have to do is to make it dense, solid, hard. Twist it, squeeze it, ram it, compress it; and insert this hard, dense cotton-rope or cylinder or cake in a hole in a rock, or the drift of a tunnel, or the bore of a mine; close it up, and it will shatter it to pieces. In a recent experiment, 6 ounces of this material set to work in a tunnel not only brought down masses which powder had failed to work, but shook the ground under the feet of the engineers in a way never done by the heaviest charges of powder.

To make gun-cotton formidable and destructive, squeeze it and close it up; to make it gentle, slow, and manageable, ease it and give it room. To make gunpowder slow and gentle, you do just the contrary: you cake, condense, and harden it to make it slow, safe for guns, and effective.

To carry out this principle successfully, you have to carry it even to the extreme. Ask gun-cotton to separate a rock already half-separated, it will refuse to comply with your request. Give it a light burden of earth and open rock to lift, it will fail. If you want it to do the work, you must invent a ruse,—you must make believe that the work is hard, and it will be done. Invent a difficulty and put it between the cotton and its too easy work, and it will do it. The device is amazingly successful. If the cotton have work to do that is light and easy, you provide it with a strong box, which is hard to burst,—a box of iron for example; close a small charge, that would be harmless, in a little iron box, and then place that box in the hole where formerly the charge exploded harmless, and in the effort it makes to burst that box, the whole of the light work will disappear before it.

Of the effect of such an explosion, an illustration accompanies this paper. The two drawings represent two views of a stockade, in close contiguity to which a charge of 25 lbs. of gun-cotton, placed in an iron box, was employed, and the consequences will be seen in the two rent and shattered trees, the largest 20 inches in diameter, which were not only removed from their places, but by some unexplained action shattered throughout into matchwood. This explosion was the first trial of English-made gun-cotton, and was made at Stowmarket, in spring.

It is, therefore, the nature of gun-cotton to rise to the occasion and to exert force exactly in proportion to the obstacle it encounters. For destructive shells this quality is of the highest value. You can make your shell so strong that nothing can resist its entrance, and when arrived at its destination no shell can prevent its gun-cotton charge from shivering it to fragments.

These are the main principles in the mechanical manipulation of gun-cotton which will probably render it for the future so formidable an instrument of war. Resistances too great for gunpowder only suffice to elicit the powers of gun-cotton. On the other hand, in its elementary state, as the open cotton-yarn, it is playful, slow, gentle, and obedient; there is scarcely any mechanical drudgery you can require of it that it is not as ready and fit to do as steam, or gas, or water, or other elementary power.

In conclusion, I may be asked to say as a mechanic what I think can be the nature and source of this amazing power of gun-cotton. In reply, let me ask, Who shall say what takes place in that pregnant instant of time when a spark of fire enters the charge, and one-hundredth part of a second of time suffices to set millions of material atoms loose from fast ties of former affinity, and leaves them free every one to elect his mate, and uniting in a new bond of affinity, to come out of that chamber a series of new-born substances? Who shall tell me all that happens then? I will not dare to describe the phenomena of that pregnant instant. But I will say this, that it is an instant of intense heat,—one of its new-born children is a large volume of steam and water. When that intense heat and that red-hot steam were united in the chamber of that gun and that mine, two powers were met whose union no matter yet contrived has been strong enough to compress and confine. When I say that a gun-cotton gun is a steam-gun, and when I say that at that instant of intense heat, the atoms of water and the atoms of fire are in contact atom to atom, it is hard to believe that it should not give rise to an explosion infinitely stronger than any case of the generation of steam by filtering the heat leisurely through the metal skins of any high-pressure boiler.—*Quarterly Journal of Science.*

ON LITERARY AND SCIENTIFIC STUDIES IN CONNECTION WITH MEDICINE.

BY J. H. BALFOUR, M.A., M.D., PROFESSOR OF MEDICINE AND BOTANY.

The following passages are extracted from Professor Balfour's Opening Lecture of the Course of Botany at the Edinburgh University, in May last:—Natural Science, in all its departments, has now become an important part of education, not merely on account of its connection with professional studies, but also from its value in mental training. It exerts a most beneficial influence on the observant faculties; it calls the perceptive powers into action; it teaches the student to note the resemblances and differences among objects; it promotes the formation of orderly and systematic habits; and it enforces accuracy, both of observation and of expression. It also benefits the mind by investing the objects around us with a new interest, and it supplies healthy and cheerful occupation at all times.

The value of natural history as an educational science consists mainly in its teaching the student to observe truly and to note accurately. The prosecution of it ought not to be confined to any one profession, such as that of medicine. It should, to a certain extent, constitute a part of a liberal education. Why should not a portion of the summer be devoted to this subject by those who have been prosecuting their literary studies during the winter months, and whose long vacation might thus be in part profitably employed in preparing the way for their future professional career? Such an arrangement would, in my opinion, be much better than attempting to extend the curriculum of arts in the direction of classics and mathematics. It is surely of importance that the student of arts should know something of the objects in the material world with which he is surrounded; that he should enlarge his views of nature, and have a sympathy with that science which teaches the structure, functions, and uses of the organized beings which people the globe, and of the unorganized matter which forms the crust?

In relation to medicine, botany must be viewed, not only as furnishing the medical man with valuable information in regard to the affinities and properties of medicinal plants, and enabling him to substitute one species for another with safety in circumstances where the usual remedies are not at hand; but it must be regarded as an important branch of preliminary study, which trains the mind of the student to those habits of observation and diagnosis which are so essential to the successful prosecution of his profession. The study of the physiology of plants, too, enables him to observe in a simpler form many of those phenomena which are more complicated and obscure in the higher orders of living beings. This is specially true of the functions of fertilization and embryogeny, the examination of which by eminent botanists, both in this country and on the Continent, has tended in no small degree to promote the advancement of animal physiology.

The training of the mind in correct methods of observation gives to botany and the other natural-history sciences their value as instruments of preparation for professional education. Edward Forbes justly remarks:—"We must counteract the natural tendency of purely professional studies—the tendency to limit the range of mental vision. We can do this most beneficially through the collateral sciences, which are sufficiently allied to the professional ones to prevent an undue dissipation of the student's thoughts, and, at the same time, are sufficiently different to give them a wider sphere of action. It is in this point of view that we should regard the natural-history sciences as branches of medical education. For my own part," continues Forbes, "after much intercourse with medical men, who have studied at many seats of professional education,—some collegiate, some exclusively professional,—I have no hesitation in saying that, as a rule, the former had the intellectual advantage. There are noble and notable exceptions, old and young, but the rule is true in the main. The man who has studied in a seat of learning, such as a university, has a wider range of sympathies, a more philosophical tone of mind, and a higher estimate of the objects of intellectual ambition, than his fellow-practitioner, who, from his youth upwards, has concentrated his thoughts upon the contractedly professional subjects of a hospital school. I will not believe that the practitioner of medicine, any more than the clergyman or the lawyer, or the soldier or the merchant, is wiser or better able to treat the offices of his calling because his mind takes no note of subjects beyond the range of his professional pursuit. It is a great pleasure, both to patient and neighbour, to find in our doctor an enlightened friend—one who, whilst he does his duty ably and kindly, has a sympathy and an acquaintance with science, literature, or art."

Those who magnify the hospital work so as to throw discredit on preliminary literary and scientific study, are doing great harm to students of medicine. No one who knows the duties of a physician or surgeon will ever think of underrating the value of clinical instruction in hospitals; but, at the same time, no one who looks at the true position of medicine as a science, and of doctors as men of science belonging to a liberal profession, will disparage those studies which, when taken in proper time, are so well fitted to enlarge the mind, to call forth its powers, and give it the means of grappling successfully with the various intricate questions in connection with bodily and mental diseases which are constantly coming under the notice of the medical man.

A university is not merely a Board authorized to examine students and grant degrees it is an educational institution, intended to exercise a surveillance over the studies of youth; to train their minds for the proper acquisition of knowledge; and to direct their energies in such a way as to insure that mental culture which will fit them for all the duties of life. As food must be properly supplied to the body in order that it may be duly nourished, so must food be supplied to the mind. It must be given in proper quantity and at proper intervals. The mind must be able to digest what is given, and time must be allowed for this. The attempt to cram too much into the mind will fail in giving due mental strength; and the administration of nourishment in a fitful and irregular manner will not conduce to proper mental culture. As in the body, so in the mind, quality and quantity must be regulated. The infant, the young man, and the old man, require different kinds of diet, both corporeal and mental. Students who rush at once into what is called the practical work of medicine, and do not contemplate anything beyond the walls of an hospital, may become what some have called *rough-and-ready* practitioners; but, wanting due mental cultivation, and the advantages of a liberal education, they cannot be expected to advance the science of medicine, and to raise the tone of the society in which they mingle. Enlarge as much as you please the strictly professional acquirements of the physician and surgeon, but never let them neglect those *literæ humaniores* which *emolliunt mores, nec sinunt esse feros*, and that knowledge of the natural sciences which makes them valuable members of society.

There can be no doubt, that every one entering upon a learned profession, such as that of medicine, ought to have in the first place a certain amount of literary education. The study of languages, both ancient and modern, of the mathematical sciences, and of mental philosophy, should precede in all cases the professional curriculum.

"We must not overlook," as our Lord Rector has remarked, "that kind of training in which the subjects learned have for their chief aim, not to inure the hand (so to speak) to the use of its tools in some particular art, but to operate on the mind itself, and by making it flexible, manifold, and strong, to endow it with a general aptitude for the duties and energies of life." Dr. Hook has well said, "By a university education we mean a liberal education; and by a liberal education we mean a non-professional education,—an education which is to be regarded, not merely as a means to something else, but as in itself an end. But here it will be necessary to explain, that when the word *profession* is used, it is not intended to confine its application to what in former times were called the three learned professions; but we apply it to any calling which requires mental as distinguished from manual labour. The professional man may be compared to a man whose eye is fixed upon a microscope. All the rest of the world is abstracted from his vision; and the eye, though narrowed to a little hole, sees what is indescribable by others, and by revealing his observations he becomes a benefactor of his kind. Now, all this we not only admit, but assert; but then we stand opposed to those who, asserting this, at once conclude that the minds of their children cannot be too soon directed to studies which will bear upon their future vocation in life. The position assumed by the advocates of academical culture is the very opposite of this. They would delay a young man's professional education as long as possible, or rather, they would insist upon the importance of the concentrated education being preceded by a liberal education; and they would apply to the training of the man a discipline analogous to that which common sense suggests in what relates to bodily exercise. When in ancient times a father was ambitious for his son, that he might win the prize at the Olympian games or Pythian fields, his attention was directed, not to the technicalities of the game, but to the general condition and the morals of the youth; for the success of the athlete depended upon the fact of his first becoming a healthy man. And precisely so we say, educate the man before you educate the *professional man;* before you send your grain to the mill, look to the raw material. How often we see the mere professional man—the man who has not received a liberal education early in life—fail when he is called unexpectedly, or in the ordinary course of affairs, to some entirely new situation, or a different order of circumstances." The mind must be disciplined and subjected to culture, which will fit it for successful professional study. Every candidate for a medical degree or diploma should therefore pass a literary examination *before* attempting to enter on purely professional work.

Having thus considered the requirements in arts, we now proceed to professional study. And here there are evidently two departments; one specially connected with the natural sciences, and the other strictly professional. These two departments should be studied separately; and the collateral sciences, such as botany, natural history, and chemistry, ought to be prosecuted in the first instance,—an examination on these preceding the student's entrance on the second department. The objections urged against natural history sciences have depended chiefly on the fact that they were studied at the same time with purely professional subjects, and that thus the minds of the students were overwhelmed with the multiplicity of objects brought under their notice, and with the necessity of preparing for an examination on one set of subjects whilst they were studying another. Natural-history sciences have been considered a hardship, not because the students disliked them *per se*, or thought that the subject was not a good one for their minds to work upon, but because the study of them came at a most improper time, because far too much of it was attempted to be taught in the time, and because the little that they could learn well was what they felt they ought to have learnt in their younger days—which they ought to have acquired before commencing their medical education, and which was not enough to enable them to apply it to practice in medicine or science. The elements of these sciences should therefore occupy the student's attention in the first place, and he should master them, and be examined on them before proceeding further. Those who choose to devote their attention to these sciences more fully, will, no doubt, gratify their taste by continuing to prosecute them afterwards; and they will necessarily be kept up to a certain degree in their subsequent medical studies.

PROFESSOR BALFOUR ON BOTANICAL SCIENCE AND THE BIBLE.

The subjoined remarks by Professor Balfour to the students of Edinburgh University will be read with interest and profit:—

I have thus given a hasty sketch of the nature of botanical science and of its bearings on other departments of knowledge, more especially on medicine. I have shown the position which it ought to occupy, as a preliminary training science, in the medical curriculum; and I have pointed out the importance of students passing an examination in it, and other natural sciences, before entering on strictly professional studies. In conclusion, I would remark that botany is a science calculated to give pleasure to every mind. It can be prosecuted at all times, whether in the closet or in the field; on the highway or on the hill-side; on the cultivated plain or in the wild mountain glen. Every flower on which we tread becomes a useful object of contemplation, and a means of pleasing recreation.

The associations connected with the practical prosecution of botany are peculiarly interesting. Those who have joined in botanical excursions know the feelings of delight with which the floral treasures of the plain and of the mountain are gathered. They will appreciate the friendships which are formed during such trips; and they will be ready to acknowledge their important bearing on the development alike of the physical and mental powers. In the prosecution of science, however, we ought ever to remember that, unless our studies are conducted with higher views than the mere acquisition of secular knowledge, they will not promote their proper object. There is a knowledge which puffs up, which spoils, through philosophy and vain deceit, and which does not edify.

In the present day there is much of Pantheistic and Rationalistic error among the followers of science, and the student must be warned of the quicksands on which he is apt to make shipwreck of faith and of a good conscience. Sometimes we find that persons who spend their lives in the study of nature, flatter themselves that a love for the works of God is an evidence of genuine religion. This is a great delusion. "A sincere and ardent love of science may induce a man to devote his whole time, talents, and wealth to the acquisition of facts, and the confirmation of brilliant theories. This may be all done by one regardless of the mind of God, as revealed in his Word; and, while enriching his intellect, and widening the domain of scientific learning, the man may, in heart and life, be a very enemy to the moral government of that Being whose works he is so fond of exploring."

It is pleasing to think that there are many men of science who are pointing out the true method of God, and who are showing that secular and religious knowledge go hand in hand. The attempts to produce opposition between the works and the Word of God have utterly failed. True science is always in harmony with religion. We say this most advisedly. We have never, and we can never arrive at a point where the discoveries of science and the truth of Scripture are at variance. The more we advance in knowledge, the more do we find of harmony between them. There is often apparent discrepancy arising, not from an increase in our knowledge of true science, but from a deficiency of information, and a perverted view of the phenomena of creation; from men becoming vain in their imaginations, and having their foolish hearts darkened, thinking themselves wise, and becoming fools.

Recent scientific statements by men of authority have led to a more earnest study of the Word of God, not merely by divines, but by Christian men of science; and we are daily seeing the clear light of truth dissipating those mists and doubts with which it had been obscured.

It is often said that in science we may discard the Bible, for it is not meant to teach science; and that, even although, when viewed in the light of modern discovery, there may be some lesser errors in it, still this does not take from its authority, as containing a revelation from Heaven. This is most fallacious reasoning. It is true that the Bible is not meant to teach science; but we maintain that it is equally true that it is in no case inconsistent with science. There is no scientific error in it. In this respect it is the Book of books. It is the inspired Word of God, truly theopneustic throughout.

Unless we have verbal inspiration, we have nothing. The Book not merely contains a revelation from God, but it is, in its words and minutest details, given by Him. Holy men of old wrote as inspired by his Spirit. That the Bible should stand thus pre-eminent throughout all ages, and that it should ever be on a level with science, however advanced, is sufficient to convince the most sceptical of its Divine origin. I cannot better express this than in the words of an anonymous writer, who says:—"A book so written as to touch upon every subject of human research, and, without anticipating discoveries which man can make for himself, not to contradict them when made, is a miracle of wisdom and knowledge of the highest order. It implies not only an acquaintance with the facts of science, but with the manner in which the human mind would deal with them. The author of the words on which everything depends in the case must possess, at once, perfect knowledge of the past of creation, and of the future development of human thought. This reasoning is altogether independent of the accuracy of our scientific knowledge. This book is suited to the extent of our knowledge as it is, and has been so for 3300 years. We do not believe that a single work can be produced on any of the natural or experimental sciences, written a hundred years ago, in which some gross errors cannot be discovered. All such books have grown old. Here is a book written 3300 years ago still green, and in which apparent discrepancies from advancing knowledge invariably prove the germ of fresh agreements."

The impossibility of producing a book thus adapted to the whole domain of science, and the whole march of time, renders it a miracle of the highest order, and one, of all others, fitted to convince us, by internal evidence, that in the words of the Bible we have the very words of God.

Let your enlightened recognition of the facts of science be ever accompanied with earnest study of revealed truth; and, while you are active and zealous in the duties of your worldly calling, be "fervent in spirit, serving the Lord."

REPORT ON THE INDUSTRY OF MANURES.

BY A. W. HOFMANN, PH.D., LL.D., F.R.S.

(*From the Reports of the Juries of the International Exhibition.*)

(*Continued from p.* 90.)

Modern Historical Events connected with the Development of the Manurial Industry.—But, were England a more signal offender than she is, or ever has been, against what may be termed the manurial equilibrium of the world, she might plead her justification in the train of modern historical events which have brought her manurial industry into its present remarkable phasis,—a phasis purely transitional, and which marks the crisis of a momentous revolution, even now in course of accomplishment.

The events here alluded to, like the revolution in which they are culminating, have their common origin in the memorable invention of the steam-engine by Watt.

The new motive power placed by Watts's genius at the disposal of mankind, after having transformed in succession every other main branch of human industry—the spinning and weaving of raiment, for example; the arts of locomotion, by land and by sea; all the various forms of brute drudgery, such as lifting, hewing, pumping, grinding, etc.; all the technical plastic arts, from the shaping of the most stubborn metals to the moulding of the most delicate clay—in a word, after having lightened for mankind all the other forms of toil, is now making its way into the farm, and impressing upon the operations of husbandry an equally signal revolution.

It is important to observe that the transformations which have preceded this final and most momentous change of all, have not only prepared the way for it, but have, at the same time, rendered its advent an indispensable necessity; as a very brief consideration will show.

It is, in the first place, by the operation of steam-power that the *handicrafts*, formerly pursued by families dispersed in villages over the whole surface of the land, have been replaced by *manufactures*, conducted in colossal factories, determining the agglomeration of enormous populations, in rapidly developed towns and cities, located usually (for the convenience of trade) upon streams and rivers leading to the sea.

Food has naturally followed population; and corn and cattle, vegetables and fruit, are daily poured from the country into the towns, in streams of constantly-increasing magnitude. The quantity of fertilizing residua resulting from the consumption of these provisions, and requiring, in fair husbandry, restoration to the distant fields from which they come, undergoes, of course, proportionate augmentation; and the problem of their reconveyance to the land has been, and still is, one of annually increasing difficulty.

During the earlier development of the factory system, the old mode of urban defecation, by means of cesspools emptied periodically, was in vogue; and much of the night-soil produced in the great manufacturing towns found its way back from these stagnant receptacles to the land.

But as the populations assembled in these industrial encampments grew vaster and more dense, diseases of the so-called *zymotic* class became more and more rife among them; and, though the respective causes of the several forms which zymotic or febrile disease assumes remained unknown, it was gradually established by professional investigations, that they had all one common favouring condition in the putrescent effluvia of stagnant filth.

To the few scientific inquirers who traced out this relation, it became apparent that the stagnant-cesspool system was radically vicious, and must be rooted out at any cost. They perceived that urban populations could only be preserved from febrile disease by the daily removal of their ejecta *before* its entry into the state of putrefaction; and for this end, a system of house and street drains, kept constantly washed with abundant supplies of water, seemed to afford the readiest means.

Here again the power of steam was on the side of progress. The public water-supply of towns, no longer led, as of old, in wooden pipes, to public fountains, thence to be fetched in pail and pitcher to the dwellings, was urged by steam-pumps at high pressure, through iron pipes having lateral branches, into the houses themselves, and even up to their highest floors. This permitted the adoption of Bramah's watercloset (a capital invention) with its swift water-rush and trapped exit-drain, instead of the noisome privy, untrapped and waterless, with its stagnant pit of putrescence beneath. And though Bramah's closet itself was a costly piece of mechanism, cheaper contrivances of like kind soon followed, bringing within reach of the poor as well as the rich the inestimable blessing of cleanly defecation.

These ameliorations had, however, gained but little attention, and were but slowly making their way, when, in 1836, the views of their advocates received at once a terrible confirmation and a powerful impulse, by the sudden outburst of the Asiatic cholera. To the horrors of this appalling pestilence reference has already been made in the Report on Disenfectants. The consternation it produced was universal; and it gave rise to that remarkable series of researches, conclusions, and practical reforms, known collectively as the modern sanitary movement.

Under this new influence, the substitution of flowing drains for stagnant cesspools was carried on with much increased activity, though obstructed by a vehement controversy as to the proper size and form of the drains. Small circular stoneware tubes were recommended by one party; large brick flat-bottomed sewers by the other. The tubular system happily proved to be the cheapest as well as the best; and its advocates, after a ten years' struggle, finally carried the day. Whole towns are now drained through 12-inch pipes, which would formerly have been deemed of scant dimension for the drainage of a single mansion.

The application of the manurial streams from urban drains to irrigate farm lands was also warmly advocated by the sanitary reformers, but as warmly declared impracticable by several leading engineers, whose views upon that part of the question prevailed.

The second invasion of Asiatic cholera, in 1849, gave a new impulse to the abolition of cesspools; and the value of tubular drains, of small size and rapid scour, for their replacement, had by that time obtained very general recognition. But the leading engineers of England, while admitting, theoretically, the value of sewage to fertilize land, still denied the soundness and economy of the mechanical arrangements proposed by the sanitary reformers for its distribution. On an engineering question, public opinion (not unnaturally) sided at the outset with the engineers. The new system has had, therefore, to encounter a professional opposition, all the more formidable for being thoroughly conscientious. Probably that opposition, with the controversy it has engendered, and, above all, the *experiments* to which it has given rise, constitutes a wholesome ordeal to test the soundness of the new plan, and to bring about the correction of such weak points as it may present. But, in the mean time, the application of town sewage to farm lands, on an extensive, national scale, has stood, and still stands, adjourned.

Hence the present condition, obviously transitional, of the great manufacturing and commercial towns of England; hence the insufferable pollution of her streams and rivers; hence that prodigious squandering of the elements of human blood, for which she is so bitterly reproached by Liebig.

But the same mighty power of steam which brought about the centralization of the manufacturing population in great towns, with the evils thence ensuing, and the sanitary ameliorations by which those evils were (in part) subdued, came fraught with other principles also, and other events not less influential in the development of the manurial industry.

Among these, the most conspicuously important, in their bearing upon this great industry, were the doctrine and practice of free trade.

The historical affiliation of free trade to steam-power is direct and obvious.

The millions congregated by steam-power had to be fed. To the working of the new factory system cheap corn was as necessary as cheap coal. The restriction of bread supplies, and the consequent enhancement of their price by artificial means, to benefit a class, became utterly inadmissible.

Protection, always a fallacy, was now also an anachronism; and, after a severe struggle, and a long series of transitional expedients, the ports of England were thrown open freely to foreign supplies of food.

The cultivators of this cold northern soil were thus exposed to the competition of rival food-growers, tilling, beneath warmer suns, the more prolific cornfields of the south.

Upon this unequal competition the English territorial proprietors entered, as upon a struggle for life or death. Abundant manuring seemed at the outset their main, if not their sole resource; hence the rapid and prodigious development (already noted) of the guano trade; hence the multiplication of manurial products from every form of waste, as manifested in the patent records; hence the celebrated "nitrogen theory" and the "high-farming" system, to which allusion will presently be made; hence, lastly, that ransacking of the whole world for bones, so criminal in Liebig's view.

Application of Steam-Power to Agriculture.—But steam-power, which has imposed upon the British cultivator this struggle for existence, brings him also the means of issuing victorious from the encounter.

Why may not the steam-urged ploughshare pass to and fro through the field, as the steam-driven shuttle passes through the fabric in the loom?

If pure water can be pumped by steam-power at an infinitesimal cost *into* a town for its supply, why may not the very same water, enriched with the *ejecta* of the population, and so converted into a powerful manure, be also pumped *out* of the town by steam-power, and applied to maintain the fertility of the land?

In a word, why may not husbandry rise, in its turn, from the rank of a *handicraft* to that of a *manufacture;* the farm be organized and worked like a factory; and food, like every other commodity, be at length produced by *steam-power?*

These questions are now in every mouth; and the agricultural revolution they imply appears to be, at this moment, in course of accomplishment by the English people.

Already, on many an English farm, the characteristic tall factory-chimney is seen rising among the trees; the steam-engine is heard panting below; and the rapid thrashing-wheel, with its noisy revolutions, supersedes the labourer's tardy flail.

Already, at somewhat fewer points, the farm-locomotive stands smoking in the field, winding to and fro, round anchored windlass, the slender rope of steel which draws the rapid ploughshare through the soil; thus furrowed twice as deep, and thrice as fast, as formerly by man and horse; and thus economically enriched with proportionately increased supplies of atmospheric plant-food.

And lastly, already, at still rarer intervals, the subterranean pipes for sewage-irrigation ramify beneath the fields, precisely as the pipes for water distribution ramify beneath the streets of the adjacent town; the propelling power being, in both cases, that of steam.

These innovations are, doubtless, still experimental; and, like all innovations, they are vaunted by some with premature zeal as perfect, while others, with pardonable scepticism, decry them as utterly impracticable. Truth for the present seems to lie between these extremes. The steam-plough, though answering well in large and level fields with favourable soils, still requires adaptation to less easy conditions of tillage. The tubular irrigating system is still liable to the sudden influx of storm-waters, overburdening, and often overmastering the steam-pumps, so as seriously to interfere with the economy of the distributive operation. But inventive research and practical experiment are rapidly proceeding side by side, and every year, not to say every month, sees some fresh truth elicited, some previous "impossibility" achieved.

Utilization of Urban Ejecta as Manure.—The separation of surface-water from sewage is, by a certain number, confidently relied on to solve the problem of sewage utilization, in conformity with Mr. F. O. Ward's formula,—"*the rainfall to the river, the sewage to the soil.*" Others are of opinion that sewage, even when diluted by admixture with rain-swollen brooks, may be economically pumped on the land. A third party believe gravitation to be the only economical distributive power for sewage, and open gutters contoured along the undulating ground the only channels suited for its conveyance.

On these mechanical questions the Reporter, as a chemist, has of course no opinion to offer. But, that the reckless squandering of town-sewage to the sea, if continued on its present prodigious scale, *must*, in a few generations, justify the worst forebodings of Liebig, and that the same steam-power which has induced the evil can alone supply the remedy, the Reporter confidently believes.

And here, perhaps, is the place to interpose a few remarks, in most respectful deprecation of the support which Liebig, in several of his works, and more especially in his latest publication,* affords to the cesspool system of urban defecation. He devotes an entire chapter (the seventh) to a description of the movable cesspools, or casks upon wheels, employed in the soldiers' barracks, in several garrison towns of Baden, to receive and carry away the whole of the ejecta, fluid and solid. He states the average cost of these cesspool-carts to be between £9 and £10 a piece; their term of duration, about five years; and their maintenance-charge about 15 per cent. of their first cost. He adds, that the sale of the manure collected and conveyed away in these carts, from several garrisons, numbering in all 8000 men, brings in an annually increasing sum; the receipts having risen from £285 in 1852, to £680 in 1858, and the tendency of the price being upward still. Upon this system he bestows encomiums, made weighty by his illustrious name and eminent authority. "Sandy wastes," he says, "more particularly in the vicinity of Rastadt and Carlsruhe, have thus been turned into cornfields of great fertility." And he adds that "there might thus be established a perfect circulation of the conditions of life, which would provide 8000 men with bread, year after year, without in the least reducing the productiveness of the fields on which the corn is grown." He further devotes much space in his Appendix to a report upon Japenese husbandry, addressed to the Minister of Agriculture at Berlin, by Dr. H. Maron, and containing a detailed account of the Japanese method of urban defecation, which is also accomplished by a system of movable cesspools, lifted out and carried through the open streets by hand.

The Japanese, Dr. Maron states, use open privies, not constructed, as in Germany, in some remote corner of the yard, but forming an essential part of the interior of their dwellings. The aperture is level with the ground, and beneath it is set a bucket or earthen pot, for removal, when full, by human hands. The Coolies thus employed are to be met, he tells us, of an evening, marching in long strings along all the roads leading out of the Japanese towns, each Coolie bearing two buckets or earthen pots of night soil for conveyance to the neighbouring farms. Caravans of pack-horses, similarly laden, are sent, he states, 200 or 300 miles into the interior; and canal-boats leave each town daily as regularly as the mail, each loaded by Coolies with high-piled buckets of the precious stuff, the effluvia of which, it is admitted, render the task of conducting these barges "a species of martyrdom."

It is precisely from this degrading and loathsome kind of drudgery that England is now resolutely bent on emancipating mankind; while yet restoring to the land, quite as faithfully as the Japanese, the fertilizing residua of human food. It is precisely against what may be termed the "martyrdom of stench," and the still fiercer martyrdoms of blood-pollution and loathsome pestilence which stench engenders, that the English Sanitary Reformers protest and struggle with all their force. And the Reporter is convinced that he will faithfully interpret their desire, in inviting for the

* 'The Natural Laws of Husbandry,' by Justus von Liebig. Edited by J. Blyth, M.D., Professor of Chemistry in Queen's College, Cork. London; Walton and Maberly. 1863.

system of defecation they propose the attentive consideration of Justus Liebig, and, if approved, his powerful support.

The organization of the so-called "continuous tubular circulating system," by which, with the aid of steam-power, the healthy and ceaseless interchange of pure water and manurial liquor between town and country is now sought to be achieved, seems destined to constitute the mechanical complement of the great chemico-physiological truths promulgated by Justus Liebig; from whose powerful genius the promoters of this plan anxiously anticipate not merely its adoption, but its incorporation in his great agricultural edifice, as its crown and pinnacle.

It is not, however, pretended by the warmest advocates of this system, that it can be accomplished by a single generation. It is admitted, on the contrary, that the complete tubularization of the farms of Europe must be a task as gradual as the complete drain- and water-pipeage of her towns, or as the universal extension of her railway and electric communications. But as the magnitude of such a project may be, for many minds, the very pivot on which their judgment of it, favourable or adverse, may turn, the Reporter quotes here, from a speech of Mr. F. O. Ward (in 1855), some remarks bearing on this point.

"It is argued," said the speaker, after adverting to the cost of the requisite pipeage, —"it is argued from this vast expenditure and widely-extended range of distribution, that the plan is impracticable. But I think this resembles the arguments urged against gas-lighting at the outset. 'What!' it was said in the old days of oil-lamps, to the daring innovators who proposed gas-lighting, 'do you seriously ask us to tear up all the streets of our towns, and lay down thousands of miles of subterranean arteries, to circulate a subtle vapour through every street and into every house, to do, at a cost of millions upon millions, what our lamps and candles already do sufficiently well?' Such was the language used; and the proposal of gas-lighting was regarded at the outset, by the majority of mankind, as the wildest and most visionary hallucination. But when Murdoch's factory had been illuminated with gas, the whole problem was virtually solved; and when the first line of gas-lights burned along Pall Mall, the illumination of all the towns of Europe became a mere question of time. Just so, when the first farm was successfully laid down with irrigating tubes for the distribution of liquid manure, there ceased to be any force in the argument about the quantity and cost of pipeage for this purpose. . . . Nor should we be deterred from grappling with the sewage problem by contemplating the vast magnitude of the results to which it will lead in the course of time—of generations, perhaps, when the whole subsoil of Europe will probably be piped for the distribution of liquid manure, just as all Flanders is already honeycombed with tanks for its storage."*

(To be continued.)

THE MANUFACTURE OF VEGETABLE OILS.

Whether considered as a medium for the application of colour in works of art, or of utility as the principal source of illuminating power where gas is unattainable, or as the lubricator without which all machinery, from the simple clock of the cottager to the most complicated and powerful engine, would be all but useless, the value of oil is incalculable; and a few words on its manufacture and the process of refining it cannot be uninteresting. To furnish these we were favoured with a visit to the extensive works of Messrs. Pinchin and Johnson, who have two sets of premises: one, for the manufacture of oil, called Albert Works, on the Middlesex bank of the Thames, near Hammersmith; the other, for refining purposes, in Cable Street, St. George's-in-the-East. The oils they manufacture are rape and linseed only, but their refining operations extend to the animal as well as the vegetable oils. The Albert Works have a river frontage of about 200 feet, and recede from the bank about the same distance, thus covering an area of more than three-quarters of an acre. The building consists of four stories; the manufacture is carried on in the lowest, the others being used as storage for the grain, which is hoisted from the barges by means of cranes worked by steam-power. The first object which arrests the visitor's attention is the engine, which is a small but beautiful piece of ma-

* 'Journal of the Society of Arts' (London), No. 120, for March 9th, 1855.

chinery of forty-five horse power. With the exception of the workmen's meal-times and Sundays, it is always at work night and day. From the engine-room the visitor is conducted to the manufactory, where, as soon as he can recover from the irritation in the eyes produced by the volatile oil escaping from the heated and bruised seed, the whole process presents itself before him.

The grain is received from the upper floor into a *hopper*, in which is a screen, the agitating of which removes all foreign substances, and suffers the seed alone to pass through its meshes. This falls between two faced, hollow, iron cylindrical rollers, which are heated by steam, and which as they revolve crush, or, as it is termed, *open the grain*. Thus opened, it is thrown on to a *steel plate calf*, fixed on a bed of solid masonry, which is constantly traversed by a pair of edge-runners, weighing from eight to nine tons, and travelling at the rate of sixteen revolutions per minute. They revolve in a strong framework attached to a vertical axis, which also, by means of a large cog-wheel at the top, which engages a wheel upon the main shaft, revolves slowly. A double motion is thus given to the grinders or edge-runners, one on their own axis and one on the iron plate, which we may consider the nether mill-stone. A raised border or rim prevents the seed from escaping from the plate, and the paste is brought regularly under the stones by means of rakes or sweeps attached to the vertical framework, and revolving with the runners on the surface of the plate. When the grain has been sufficiently ground, the paste is brought to an open portion of the rim, and falls over into perforated troughs placed to receive it. Through the perforations a considerable quantity of oil oozes, and this, being considered purer than that which is obtained by expression, is conveyed to a cistern set apart for the purpose. The paste is next put into a jacketed kettle,—that is, one surrounded by a hollow chamber, into which steam is injected for the purpose of heating it. Within this kettle is an agitator or stirrer, so that all the paste is in turn brought to the heated surface and raised to an even temperature. Having remained in the kettle six minutes, it is collected in woollen bags, about eighteen inches long and six inches wide, each bag is placed between four layers of press hairs (a kind of horse-hair mat), and eight of them being thus prepared, they are ranged in two perpendicular rows between four grooved shelves of a hydraulic press. The pumps, worked by the steam-engine, are set in motion, and a pressure of 400 tons is speedily realized. The oil, being expressed, runs into an underground tank; the bags are then withdrawn, and on being removed, the residue presents itself in the form of what is known as linseed cake. These cakes are placed in a rack to cool, when they become so hard as not to be easily broken; they are then orderly stacked, and from time to time sent away in waggons or barges to supply the cattle-food market, for which purpose the cake is in great request.

A quarter of linseed, which only undergoes one pressure, yields an average of 120 lbs. of oil and 35 cakes of nutritious food, each weighing 8 lbs., or an agregate of two hundredweight and a half. Rape seed, which is twice ground and pressed, yields per quarter from 88 lbs. to 90 lbs. of oil at the first, and from 60 lbs. to 70 lbs. at the second pressure. Of these two kinds of oil-producing seeds upwards of 600,000 quarters are annually imported, and this mill alone works up 35,000 quarters per annum. Calcutta, Bombay, and Kurrachee are the great emporia for the seeds; and it is a remarkable fact that, whereas the last-named place, when it fell into the hands of the British in 1839, consisted of only about fifty wretched huts, inhabited by fishermen, it is now a thriving port, and one of the principal outlets for the oil-producing seeds of India.

After the oil has remained a few days in the receiving cistern, the parenchymatous matter subsides; it is then pumped into vats for a second settling, after which it is barrelled and conveyed to the refinery. This is situated about a quarter of a mile down the Blackwall line, of which property it occupies nine arches in its rear. The premises are very large, and are used not only for refining vegetable but also animal oils. The casks of unrefined oil are hoisted to the upper floor by means of a crane worked by steam. Along this floor a large vat, capable of holding ten tons, is extended. It is lined with copper, is fitted with a horizontal agitator or fan, and is called the reception vat. Into this receptacle five tons of rape oil are decanted, an equal quantity of water is added, and the whole treated by chemical process. The agitator is set in motion, and after four or five hours the oil becomes thoroughly washed, its impurities having been removed. The agitation is then stopped, and the water and bleaching ingredients are allowed to subside. The oil is next drawn off into the boiling vat on the next story. This vat also is lined with copper, fitted with fans or agitators, and a coiled perforated tube; steam is admitted into the tube until a uniform temperature of 212 degrees is obtained. It is kept in this condition and continually agitated for about four hours, when all impurities having been thrown off, it is allowed to cool, assisted by the fans, which bring every portion in turn into contact with the air. At the end of eight or ten hours it is sufficiently cool to be drawn off into the filters, which are on the lower story. Each filter contains five tons. Having passed through the filter, the oil, fully refined, is pumped into appropriate tanks to be ready for barrelling, and receives the name of colza oil, on account of its illuminating properties; the true colza being an oil expressed from the *Brassica oleracea*, a variety of the cabbage plant, from whose seeds an oil much used on the Continent is expressed.

Some idea may be formed of the vast quantity of purified rape-oil consumed for lubricating and illuminating purposes, when this refinery alone sends out upwards of two thousand tons per annum. A single railway company consumes three hundred tons a year, and the Great Eastern requires a thousand gallons for the single voyage to New York. Whale, seal, and sperm oils are refined by a more simple process. They are simply filtered through flannel bags; the residue of the common kinds is called foots, and is one of the ingredients used in the manufacture of soap. The deposit produced in the filtration of sperm oil is called spermaceti, and is very valuable, commanding a ready sale at £90 per ton. These oils are used for the purpose of illumination only, with the exception of sperm, which is employed in the cotton districts for the lubrication of spindles. Large quantities of olive oil are imported from Spain for lubricating machinery, and immense quantities of American lard are imported, pressed, and filtered for obtaining the oil known as lard oil, which is considered a good lubricator, and certainly has the quality of cheapness to recommend it.—*Mechanics' Magazine.*

ACCIDENTAL POISONING.

LIVERPOOL SUMMER ASSIZES.—CROWN COURT.—(BEFORE LORD CHIEF JUSTICE COCKBURN.)

Richard Poole surrendered upon an indictment, charging him with having, at Liverpool, feloniously killed and slain one John Lingard, on the 11th of April last. Mr. Aspinall, Q.C., and Mr. Samuell appeared for the prosecution; the Hon. Mr. Liddell, Q.C., and Mr. Potter for the defence. Prisoner pleaded not guilty.

It will doubtless be in the remembrance of our readers that the prisoner, a young man about twenty-five years of age, was a dispensing assistant in the establishment of Messrs. Clay and Abraham, chemists, Bold Street, and that the deceased was a plumber and glazier, residing in Mount Pleasant. On the 11th of April last, Dr. Nottingham prescribed a lotion and a powder for the deceased, who was suffering from an affliction in one of his eyes; the latter was to be composed of five grains of James's powder and six grains of Dover's powder. The prescription was taken, in accordance with the directions of Dr. Nottingham, to Messrs. Clay and Abraham's shop, in Bold Street, by Miss Witter, who was at the time staying at Mr. Lingard's house. The prescription was first handed to Mr. Whitton, who looked at it and then passed it on to one of the assistants, whose duty it was to copy it. That having been done, the prescription was giving to the prisoner, who made it up. In doing so he had to use two bottles, and it appeared that the one containing James's powder was placed upon the same shelf and almost side by side with another bottle of the same size, form, and appearance, which contained strychnine. Between these two there was only one other bottle, of the same description, the strychnine bottle being the second, and the James's powder the fourth, from the end of the row. Before the powder was handed to Miss Witter it was passed on to Mr. Whitton, who, after looking at it and smelling it, gave it to the young lady. The powder was given to the deceased the same night, at bedtime, and almost immediately afterwards he complained of feeling ill. His symptoms rapidly developed into such as accompany strychnine poisoning, and in the course of an hour he died.

Mr. Aspinall told the jury that the real question they would have to consider would be, not so much what was the cause of death, as whether or not the circumstances under which the prisoner made up the prescription had been such as would bring home to him the charge of manslaughter. In order to make out the charge in a case of this description, it would be necessary to show that the prisoner had been guilty of gross and culpable negligence. The row of bottles, to which allusion had already been made, had been placed in a box in precisely the same order as that in which they had stood upon the shelf, and were in court; and the jury would see that the strychnine bottle had, in addition to the label "strychnia" on it, a second label, bearing the word "poison." He submitted that if the other facts of the case were proved, the jury would be of opinion that the negligence was made out, even though the two bottles might at the time have been reversed as to position on the shelf.

Dr. James S. Smyth, of Rodney Street, deposed that he saw deceased before death. He was sent for at half-past ten; reached deceased's house at twenty-five minutes to eleven; death took place a quarter before eleven. The deceased, when first seen by witness, seemed in comparative repose. He inquired from Dr. Harris, who was in the room on his arrival, if he had seen the previous convulsion, and what was the nature of the attack. Dr. Harris said that it seemed to be epileptic. Mr. Merrick, partner to the deceased, was present, and remarked that Lingard told him that there must have been strychnine in the powder that he had taken. Witness asked Lingard what he knew of strychnine; he said that he had once taken it as a medicine, and recollected the taste. Witness asked for the prescription of the powder, and retired with Dr. Harris to consult as to what should be done. They had not been more than two minutes in the adjoining room before they were recalled. Lingard was then in strong convulsions, and in these he died. Cross-examined: Are you aware that Lingard suffered from gall-stones? Witness: No. Would not they, if present, produce great pain? Witness: Yes; but not cramp in the legs, which, as far as I understood from those in attendance, was the only pain complained of.

Amongst the witnesses examined in support of the prosecution was Dr. Nottingham, who gave evidence as to the appearance of the deceased's body after death. He made a *post-mortem* examination of the body eighteen hours after death, when the blood was fluid; the scalp, the membranes of the brain, and the membranes covering the spinal cord, were charged with blood; there was a considerable quantity of a reddish watery fluid in the cavity of the skull; the lungs were heavily gorged with dark fluid blood; the heart was empty. The stomach and contents were placed in a jar and sealed, and other portions of the body were placed in three other jars, and these were handed over to Dr. Edwards. Taking into consideration the symptoms attending the death of the deceased, and the appearances visible at the time of the *post-mortem* examination, he considered the cause of death to be poisoning by strychnine.

Dr. John Baker Edwards, analytical chemist and lecturer on chemistry and medical jurisprudence at the Liverpool Royal Infirmary School of Medicine, stated that he had examined the stomach portion of the duodenum, spleen, and heart, the liver, blood, and kidneys, handed to him by the last witness. After detailing the analytical treatment to which he had subjected the contents of the jars severally, he said the results of repeated and various tests applied to them corresponded in appearance with those which would be produced by strychnine. He had poisoned two frogs and two mice, with all the physiological effects of poisoning by strychnine, by administering to them small doses of the substance extracted from the contents of the jars which had before given the test results stated. From these experiments, he was satisfied that the stomach of the deceased contained a fatal quantity of strychnine. He also detected strychnia in the liver, in the kidneys, and in the structure of the tongue. He found traces of meconic acid in the stomach, but no antimony.

The Lord Chief Justice, addressing witness,—Dr. Edwards, you have given your evidence with great distinctness and lucidity.

Joseph Whitton, an assistant in Messrs. Clay and Abraham's shop, said that on the 11th instant the prisoner was engaged as the regular dispenser, but had occasional assistance. It was his duty to make up the medicine. When Miss Witter brought Dr. Nottingham's prescription to him, he entered it in an order-book, and then passed it on to the prisoner. The powder contained James's powder and Dover's powder. He did not see the bottles from which the prisoner made it up. One bottle separated the bottle containing the James's powder from that containing the strychnine. The Dover's powder was kept on the dispensing counter on a shelf facing the dispenser's counter. There were five rows of bottles in an upright position, forming part of the dispensing counter, and in front of the dispenser. These bottles were in constant use, and they had no other bottles containing strychnine in the whole shop. The bottles were alphabetically arranged. The bottle between the strychnine bottle and the James's powder bottle contained Savine powder. When the lotion and the powder had been made up, it was placed by the dispenser on a till. Witness then took out the cork, examined the lotion, and found it correct. He next took the powder out of the wrapper, smelled at it, and being satisfied with it, he gave them both to Miss Witter. He could detect the Dover's powder by the smell; he did not look at the powder; the James's powder had no smell; neither had strychnine any smell.

Cross-examined by Mr. Liddell.—The bottles on this shelf had been rearranged since the 11th of April. That had been done in consequence of the presentment made by the coroner's jury. He was Messrs. Clay and Abraham's senior assistant. It was Mr. Knowles's duty to arrange the bottles in that part of the shop, and also to put the drugs into the bottles. James's powder was very frequently used. James's powder and strychnine were so alike in colour that had he opened the powder he would not have known the difference, but he could have detected it by the taste.

His Lordship.—But I suppose you are not in the habit of tasting the strychnine? (Laughter.)

Witness.—No, my Lord. (Renewed laughter.)

Cross-examination continued.—Prisoner had been two years in the employment of Messrs. Clay and Abraham. For some years previously he had been with a chemist at Southport. Witness had always found him very careful and attentive to his duties.

Richard Knowles, late assistant at Messrs. Clay and Abraham's shop, said the strychnine was kept at that establishment in a pulverized state. He had not examined the shelves on the 11th of April; but he did so the day previously, when he found they were in their right places. He was of opinion they were arranged in their proper order on the 11th of April.

Mr. Whitton was here recalled, and, in answer to Mr. Liddell, said that when he asked the prisoner what bottles he had made up the powder from, he pointed to the James's powder bottle and the Dover's powder bottle.

This was the case for the prosecution.

The Hon. Mr. Liddell, Q.C., then proceeded to address the jury on the prisoner's behalf. He said he was not going to deny that the deceased died from strychnine, for that would be utterly useless in the face of the evidence adduced. But there were two points to which he intended to address himself: one was, whether the strychnine was contained in the powder which the prisoner dispensed; and the second was, whether that powder, if so dispensed, was issued by him, and whether that issue was the result of gross and culpable negligence on his part. As to the point whether that powder was the powder which the prisoner dispensed, it was not for him to disprove, but for the prosecution to prove. Therefore, he had not any remarks to make upon that. There was one very curious thing in the case, that though the attention of the medical men were called to the deceased in a quarter of an hour after the powder was taken, no search ever appeared to have been made for that paper in which the powder was contained, and not one tittle of evidence had been given to show what had become of it. The only scientific evidence that the prosecutors could bring before the jury to show them that strychnine was taken from the powder dispensed by the prisoner was, that they found traces of an acid called meconic acid. He did not say it was impossible to discover even a minute portion of such an acid as that, but he did say this, and he thought the jury would agree with him, that supposing this was a question of poisoning by opium, and that the evidence had been that a small discoloration took place, caused by so small a quantity that figures would not represent it, they would have to pause well before they arrived at their verdict. It was remarkable that the deceased had taken strychnine before that date, and it had not been shown them when he discontinued taking it. He would now pass on to deal with what he considered was the real and substantial evidence on behalf of his client. His learned friend, in his opening remarks, said that in order to bring the evidence home against the prisoner, they must make out a case against him of gross and culpable negligence. He

(Mr. Liddell) would not attempt to define what negligence was, because he believed it to be impossible to define it. He had looked through a great number of cases upon the point, and had read many books upon the point, and he defied anybody to give an accurate definition of what negligence was in that case. But this much he would say, that the question of negligence was the question for the jury, and for the jury only; and he should submit to them and to his Lordship that to make out negligence sufficient to justify the jury in finding the prisoner guilty of the felony of manslaughter, to say the least of it, it must be something more than mischance. Therefore, as he put it to the jury, the point that they would have to try, assuming, without admitting, that strychnine was given by the prisoner for James's powder, the question for them would be, did the evidence show that his conduct was the result of gross and culpable negligence, or was it not rather proved that the accident was the result of mischance? Before examining the evidence adduced, he wished to make a passing remark, viz. that experience would teach them that, in all cases of that kind, when preliminary inquiries took place, when the matter was fresh in the mind of the public, and when the public mind was a good deal excited by sympathy for the poor deceased, there was a natural tendency to fix the blame upon somebody. And generally it very often happened that with that natural tendency upon their minds to satisfy doubts, it was said "Oh! it was so-and-so's fault," and that that somebody was a subordinate, and that he had to bear a great portion of the blame that attached to his superior. It was so in the case of the Egham accident, and he (the learned counsel) could not help expressing his surprise at reading the remarks made by the learned judge upon that case in his address to the grand jury. He said that in his opinion it was not right to throw the blame, when accidents of that kind took place, on persons in an inferior position; and that inferior persons employed upon the railway ought not to be made responsible for anything that occurred in consequence of a want of proper management or proper arrangements. Now he could not help drawing the attention of the jury to those remarks, which were made by a very learned judge. In that case, when the evidence was sifted, it turned out that proper arrangements were not made, and the prisoners arraigned were acquitted. If the jury, in considering the evidence in this case, should find that proper precautions were not taken to separate the poisons from the ordinary drugs; if they found that even in the state in which they were proper precautions were not taken to mark the poisons, not only by putting a label upon them, but also to make them distinguishable to the touch; if they found the prisoner was a well-conducted, careful person, bearing a high character for his position in life, who had always conducted his business in a careful and proper manner, and who had conducted his business upon that day in the ordinary manner, and had taken the ordinary precautions—there was no suggestion that he was drunk, that he was careless; there was nothing offered to show that by any act of his he was incapacitated to do his duty—and then if they found that in the hurry of his business, and possibly, in the gloom of the dark part of the shop, at half-past five o'clock in the evening, by a mere slip of the hand he took down the wrong bottle, and that, having done so, there was nothing to attract his attention to it, he made up the prescription in the usual way, taking the usual precautions before sending it out;—he hoped, if he was able to make that out, the jury would exercise their discretion, and say it was rather a mischance accident than one due to gross and culpable negligence. After carefully going through the evidence, the learned counsel said that, supposing the strychnine had been kept at Messrs. Clay and Abraham's establishment in a crystallized state, and had been kept in corrugated bottles, the accident never would have arisen. There was the clearest admission on the part of the prisoner's superiors that they had not exercised proper precaution, in the fact that since the coroner's jury had made a presentment that the drugs should be separated from the poisons, they had been placed in a separate cupboard. Therefore the whole of these precautions being omitted, the prisoner was not answerable for that. He (Mr. Liddell) did not ask the jury for their sympathy,—he scorned to ask for it; but he asked them as honest men and Englishmen, when they found that all the precautions he had alluded to had been omitted,—if they thought the accident arose in consequence of it,—he entreated them not to visit it upon the head of the young man who was then at the bar. The learned counsel called witnesses as to the prisoner's character.

Dr. Nicholl said he had always found him an unusually careful dispenser, in comparison with many others he knew.

Mr. Abraham said the prisoner had been two years in his employment, and during that time he had been one of the most careful, able, and attentive young men he had ever had in his shop.

His Lordship, in summing up, said that if the jury were of opinion that the death of the deceased was caused by an accident that might have happened to any careful and attentive man, it would be their duty to acquit the prisoner. According to the analysis of the very scientific gentleman (Dr. Edwards) who has been called before you, and who gave his evidence with a clearness and scientific precision which appeared to me extremely deserving of praise—if James's powder had been present, it would have been inevitable that antimony would have been discovered, and there was none. Dover's powder was to a certain extent traceable, because there was that which indicated the presence of opium. Therefore it is suggested that strychnine was substituted by mistake for James's powder, the strychnine bottle being in most dangerous proximity to the James's powder. It was to be regretted that the arrangement since made by the firm of Clay and Abraham with respect to their drugs and poisons had not been made before the death of the deceased, as in that case the accident would never have occurred.

The jury, after consulting together about five minutes, returned a verdict of "Not guilty," and the prisoner was immediately discharged.

CASE OF POISONING BY STRYCHNINE.—ACTION AGAINST THE CHEMISTS FOR DAMAGES.

LIVERPOOL ASSIZES.—NISI PRIUS COURT, AUGUST 17.—(BEFORE MR. BARON PIGOTT.)

LINGARD, ADMINISTRATRIX, *v.* CLAY AND ABRAHAM.

This was a special jury cause, brought under Lord Campbell's Act, for the recovery of damages. The circumstances which were the cause of action have excited considerable attention, and gave rise to a trial for manslaughter during the present assizes. —Mr. Attorney-General James, Q.C., Mr. Aspinall, Q.C., and Mr. Samuell, were retained for the plaintiff; Mr. Temple, Q.C., and Mr. Quain, were counsels for the defence.

When the cause was called on,

Mr. Attorney-General James, addressing his Lordship, said—We are going to take a verdict, my Lord, for £1500.

His Lordship.—A verdict by consent, is it?

The Attorney-General.—If your Lordship will wait for one moment, it is necessary to say a few words. The action is brought under Lord Campbell's Act, and as there must be an apportionment, no doubt the jury will take what we suggest. The verdict will be for £1500; £500 to the widow, and £500 each to the two younger children. The eldest child comes in for some property by the death of the father.

His Lordship.—You must give the eldest child something.

The Attorney-General.—Yes, my Lord, we will give him, say, £1; though I don't know that it is necessary.

His Lordship.—Well, I thought that he had sustained some injury.

The Attorney-General.—Well, say a shilling to the other; then the verdict will be for £1500. 1*s*.

Mr. Temple.—Now, my Lord, this was an action brought by the administratrix of a person who met with his death in consequence of a person in the employ of the defendants, who are eminent chemists in this town, having unfortunately mixed strychnine, instead of James's Powder, with the medicine that had to be administered. Now, I was prepared with a large body of evidence, comprising nearly all the most eminent physicians and surgeons in this town, and also a great number of chemists from different parts of the country—amongst the rest, from the chemists of Her Majesty, who have dispensed the medicines of the Royal Family for the last thirty years —for the purpose of making out that, although this sad mischance had taken place, the defendants had always conducted their business with great care, and had so arranged the various medicine bottles, including poisons, as in their best judgment would be most likely to guard against accidents. I have this vast body of evidence to express approval of the mode adopted by the defendants, and also to show that it was very commonly adopted and most approved of by the profession. I think it but justice, with the consent of the Attorney-General, to make that statement; but, as your Lordship knows, it would have amounted to no defence. We still should have been liable at law. And I may say that Messrs. Clay and Abraham have said to me that, even supposing they could have hoped for a verdict on any strictly legal ground, they should feel it their bounden duty, under the circumstances, to pay to the widow such a sum as might be considered reasonable and proper. For these reasons the defendants have consented, as has been stated, to a verdict for £1500.

His Lordship said—Gentlemen of the jury, I think we may all say we approve of the course the defendants have taken. For my own part, I must say, we all know accidents will happen, as the common saying is, in the best-regulated establishments; but I would make this one further observation, that in these matters of dealing with poisons I think it would be an excellent practice for everybody to keep them under lock and key, and separate from any other and harmless drugs. I do not by any means say the defendants have not done so. I am glad there would have been all this testimony to the good management of the establishment; and their having consented to a verdict is, I think, an act of good feeling on their part. The damages will be £1500, £500 of which will go to the widow. Under the Act of Parliament, you are to say how the damages shall be divided between the widow and children, if it is the case of a parent. In this case it is the parent, and £500 will go to the widow and £500 each to the younger children. The eldest child comes into some money by the death of the parent, and one shilling is sufficient, in the view of the parties who are watching the case in his interest. You will find a verdict to this effect.

The jury found accordingly.

POISONING BY CALABAR BEANS.

We extract the following particulars from a Liverpool paper :—

Very great alarm was excited in the neighbourhood of Greenland Street, yesterday afternoon, by the sudden manifestation amongst a large number of children of symptoms of poisoning. During the whole of the afternoon young children thus afflicted were being conveyed to the Southern Hospital, at which institution upwards of forty sufferers were received, one of whom died shortly after admission. It appears that about noon yesterday a quantity of rubbish—taken from the ship 'Commodore,' belonging to Messrs. Tobin and Co., now lying in the Queen's Dock Basin, and which has recently arrived from the western coast of Africa—was carted to Greenland Street, and deposited on a piece of waste ground between that street and New Bird Street, adjoining the Raffles Memorial Building. This rubbish, which consisted principally of ships' sweepings, shavings, etc., was soon overhauled by the children playing about the neighbouring streets, who found amongst it a number of beans, which, probably mistaking them for nuts of some kind, they cracked and ate. Almost immediately afterwards several of them became violently sick, and so unwell that it was thought necessary to take them without delay to the hospital. The first child taken was Mary Ann Foster, six years of age, residing in a court in Bell Street. She was quickly followed by Mary Pierce, a little girl living in 4 Court, Bell Street; and the third patient was Michael Russell, six years of age, who resided with his parents at No. 15, New Bird Street. This boy is said to have eaten six of the beans; when taken to the hospital he was almost dead, and though remedies were promptly applied, he died in a very short time. This was the only case which had terminated fatally, and the fact that the effects have not been more serious is attributed by the surgeons in a great degree to the circumstance that the majority of the children had had their dinners before eating the poison, so that it was taken on a full stomach. Two of them, besides the deceased, were extremely unwell, but they are now much better. The whole of the children were very ill, the pupils of their eyes were contracted, they had severe griping pains, and vomited constantly. For several hours Dr. Wollaston and Mr. Evans were busily employed in attending to these patients, and their efforts were so far successful that by last evening the greater number of the children were in a fair way of recovery, although it will be some days before they are quite well. Several children were also taken to the Southern Dispensary, where they were properly attended to. It is probable that others were provided for at their own homes, so that altogether about fifty children were affected by the poison. Upon examination, the poisonous agent was ascertained to be the Old Calabar Bean (*Physostigma venenosum*).

INQUEST.—An inquest was subsequently held by Mr. P. F. Currey, the borough coroner, for the purpose of inquiring into the circumstances attending the extraordinary poisoning of children in Toxteth Park, on Wednesday, the 10th instant, and more particularly into the death of Michael Russell, a little boy six years of age, whose parents resided at 15, New Bird Street.

The first witness called was Jane, wife of Michael Russell, a joiner, who said that on Thursday week the deceased, who had been out to play, came home about two o'clock. He was crying, and on entering the house fell on the floor, and in answer to his mother, said he had been eating some nuts which he had found on some waste ground close by the school in Greenland Street. She took him to the Southern Hospital.

Thomas Costain, overlooker for the Company of African Merchants, carrying on business in Walmer Buildings, Water Street, stated that the barque 'Commodore,' which belonged to them, and lay in the Queen's Basin, was discharged eight or nine days ago. Her cargo consisted of palm oil, Calabar beans, and ebony. He did not know that there were any beans taken from the vessel, as he had given strict orders to the porter on the quay, and the lumpers engaged in discharging the vessel, to pick them all up, as they were valuable. He said this because he had seen some of them scattered about. On leaving the vessel last Wednesday week he gave orders to the foreman porter, William Frith, to send for Mr. Griffiths, who was in the habit of buying the sweepings of the company's vessels. He did not give orders to any carter to remove the rubbish.

Samuel Price, a carter, living at 15, Crump Street, stated that on Wednesday or Thursday week he was employed by one of Mr. Tobin's workmen to remove a load of rubbish from the quay of the Queen's Basin, but the man gave him no direction where to take it. He was to have 2*s*. for removing it, and he deposited it on the waste land between New Bird Street and Greenland Street. He never laid anything down in that place before from ships, and he thought he was doing no harm. He did not observe any beans like those produced amongst the rubbish.

Inspector Moore deposed that having had his attention drawn to a number of children who were being conveyed to the hospital, in consequence of having been poisoned by eating the beans, he had the rubbish buried in the soil-yard in Vauxhall Road, having first separated the beans from it and taken them to the Jordan Street Bridewell. The carter Price, having been brought to him as the person by whom the rubbish had been deposited on the land, said he had been employed by the overlooker for the barque 'Commodore' to remove the rubbish, and that he was desired to take it to the north end, but the price being so small he deposited it in the waste land in Greenland Street, being nearer.

Mr. James Irvine, general merchant, No. 31, Temple, Dale Street, stated that the Calabar beans had latterly been brought as part of cargoes in ships from Calabar. In this country they were used as a lotion for the eye; but in Calabar they were used for poisoning entirely. They varied in their effects; sometimes half a bean would poison a man, when twenty beans would not if they induced vomiting.

Police-officer James Storey, 802, deposed to the steps which he took for the recovery of the beans in the possession of children in the neighbourhood, at home, in the streets, and at school. He found out Price the carter, who said he had been engaged by some one from Mr. Tobin's to remove the rubbish to the north end, but the pay was too small for taking it so far, and he thought it no harm to place it where he did.

Dr. Galston Wollaston, house-surgeon at the Southern Hospital, said when the deceased was brought to that institution he was in a state of extreme collapse, from which he never rallied, and died in less than half an hour. Upon making a *post-mortem* examination of the body, he found all the organs healthy, with the exception of the lungs, which were somewhat tuberculous. The stomach and upper part of the small intestines contained a substance resembling slightly-digested nuts. He attributed death to the poisonous effects of the Calabar beans taken into the stomach.

Dr. Cameron, residing at 17, Rodney Street, who was in attendance at the hospital, gave similar evidence, and added that forty-six children were admitted suffering from the effects of the same poison.

Dr. John Baker Edwards deposed,—I am an analytical chemist and lecturer on medical jurisprudence at the Royal Infirmary School of Medicine, Liverpool. On Friday, the 12th instant, I attended a *post-mortem* examination of the remains of the deceased Michael Russell, and removed the stomach, intestines, and parts of the viscera of deceased in jars, which I conveyed to my laboratory at the Royal Institution for chemical examination. On the same day I received from Inspector Moore a parcel of beans, said to be similar to those of which the said Michael Russell had eaten. The beans are those known in medicine as Calabar or ordeal beans (*Physostigma venenosum*). I proceeded to make an alcoholic extract of the beans, also of the contents of deceased's stomach, and of the contents of deceased's intestines. The stomach contained only five fluid ounces of fluid, consisting of a few fragments of the bean and the remains of a mustard emulsion which had been administered shortly before death. The quantity of alcoholic extract from the stomach was therefore very small, and its reactions were obscured by the mustard. After further purification by ether, an extract was obtained which caused marked contraction of the pupil in the eye of a rabbit when applied to it externally. From the intestines of deceased I obtained seventeen fluid ounces of an emulsive fluid, which, after digestion with the alcohol, yielded an extract, which was then purified by ether and evaporated. This ethereal extract corresponded in its reactions with a similarly-prepared extract of the beans under examination. The chemical reactions on a watery solution of the ethereal extract are as follows:—1. A pink colour, struck by caustic potash, which gradually increases in intensity to a deep red, and when mixed with chloroform forms a deep red chloroformic solution, which separates from the clear yellowish supernatant liquor. 2. A red colour, struck by strong sulphuric acid, with separation of a resinoid coagulum. 3. A violet colour, changing to red by sulphuric acid and crystals of bichromate of potash. 4. A similar colour, with sulphuric acid and binoxide of manganese, retaining the purple colour for a long time. 5. A yellow precipitate, with solution of iodine in iodide of potassium. 6. A purple colour, with terchloride of gold and reduction of metallic gold. 7. A yellow colour, struck with caustic ammonia, which, exposed for some hours to light, turned green, and finally a deep blue. I applied a few drops of the aqueous emulsion of this ethereal extract obtained from the intestines of deceased to a frog's back, by insertion under the skin. In a short time the animal manifested an indisposition to movement, and became very quiet. In the course of an hour it became unable to jump, or to remove the position in which its limbs were placed, and in about two hours it became perfectly flaccid and insensible to any external irritation; although stimulated by strychnine, it was incapable of being roused to muscular exertion, and soon expired, having previously exhibited very irregular respiration and pulsation. A second portion of the emulsion was exhibited to a mouse, which became soon paralysed in its limbs, and died after a few hours. A third portion was introduced into the circulation of a mouse by the ear, and after twenty-four hours the poison operated fatally, by complete paralysis of the limbs and senses, and the animal died by syncope. A fourth portion of the emulsion from the intestines of deceased, applied to the eye of a rabbit, caused strong contraction of the pupil after three-quarters of an hour. Similar results were obtained by an ethereal extract of the bean itself.*

The Coroner, in addressing the jury, remarked that the case was one of a distressing character, there being no doubt from the evidence that the death of the deceased was occasioned by the poisonous action of the Calabar beans which he had eaten. The only question for the jury was, whether there was negligence on the part of any

* For further particulars see "Notes on the Cases of Poisoning by Calabar Beans," by Dr. Edwards, p. 99.

one who was connected with the beans. It appeared by the account of the carter, that 2*s*. was to be given to him for taking them to the north shore; but that, as this was too far, considering the price he was to receive, he had deposited the beans in the piece of waste land in Greenland Street, this being nearer, and he thought there was no harm in doing so. He also said he was not aware that there were any of the beans amongst the rubbish. Care should be taken in discharging ships whose cargoes contained articles of a poisonous character, because children would play about rubbish to which they could have access, and serious results might follow. In this instance 46 children ate of the beans and were carried to the Southern Hospital, though only one had died. It was a singular fact that the one who died was not sick; he must therefore have retained a portion of the poisonous bean in his stomach. The Coroner then read an extract from the 'Transactions of the Royal Society of Edinburgh,' containing a description of the plant that produces the ordeal bean of Calabar. The extract was from a paper read before the Society by Professor Balfour, of the University of Edinburgh. It was as follows:—"It has long been known that in various parts of Africa the natives are in the habit of subjecting to the ordeal of poison parties who are suspected of crimes. On the east coast we meet with *Tanghinia venenata*, yielding the Tanghin poison-nut of Madagascar, and on the west coast seeds and barks of different kinds have been employed as ordeals, the sources of which, however, have not been hitherto fully ascertained. Dr. Kirk, naturalist to the Livingstone expedition, states that the Manganja tribe, in the south-east of Africa, believe in a god and in medicine, or the ordeal which he directs as the means of discovering crime. If the ordeal causes vomiting, it shows innocence; if it acts by the bowels, crime; and the person is put to death. But the doctors have a good knowledge of which to give, for there are different plants used. In the district of Old Calabar a bean is used for an ordeal poison, to which the name of Eséré is given. It possesses extraordinary energy, and the attention of the missionaries of the United Presbyterian Church of Scotland in that quarter was directed to this poison several years ago. The Rev. H. M. Waddell, one of these missionaries (now in Edinburgh), brought some of the beans to this country; and of late numerous specimens of them have been sent or brought to Edinburgh by other missionaries." There was no doubt, the Coroner observed, that the beans were brought as part of the cargo of a ship, and extreme caution should have been used in disposing of the rubbish, amongst which a part of the cargo might have escaped. There was no law that he knew of affecting any of the parties in this case, as the poor boy had injured himself by eating the beans. He thought, however, that more caution should have been used.

The jury, after a short consultation, returned a verdict to the effect that the deceased had "died from the effects of incautiously eating a poisonous bean, called the 'Calabar Bean,' which had been incautiously delivered from a ship in some rubbish." The jury accompanied with their verdict an expression of opinion that the captains of ships bringing cargoes which contained articles of a dangerous character should exercise caution with regard to the place in which the rubbish was deposited. The Coroner told Mr. Costain, the overlooker, that it would be well, when Calabar beans and articles of that nature were brought as part of the cargoes of ships, to give the captains strict instructions with regard to the discharge of the vessels, in order that due precaution might be exercised. He hoped that a case of this kind would never occur again. He highly commended Inspector Moore and police-constable Storey for the prompt measures which they took in connection with the occurrence. He thought their conduct was deserving of great praise.

THE LATE ACCIDENT AT LIVERPOOL.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The astounding fine which, with the heavy costs, Messrs. Clay and Abraham have to pay for the carelessness of an assistant, may well alarm the whole trade at their terrible responsibility.

If the error had been committed by one of the "*Principals*," so heavy a fine might, with some reason, have been deserved; but when it occurred through the act of a paid assistant, and a similar mistake may any hour be made by any young man in any establishment, however well-conducted, it appears to me that though the weight of the blow falls upon Messrs. Clay and Abraham, it in reality concerns the whole of the chemists and druggists in the kingdom, who ought and (I have no doubt) will sympathize with these gentlemen.

But ought we only to sympathize with them? Would it not be more to the purpose if a subscription were entered into by the whole trade to pay the fine and costs? Yours respectfully,

A Birmingham Chemist.

LEGISLATION AFFECTING PHARMACY.

At the end of the Session, the Metric Weights and Measures Bill—the text of which will be found in our July number, page 36—passed the Legislature, and with some slight alteration and the following addition to the 2nd clause, has now become law:—"Or on the ground that decimal subdivisions of legal weights and measures, whether metric or otherwise, are used in such contract or dealing."

At the same time, for the purpose of extending the "Poisoned Grain Prohibition Act of 1863," was passed an Act to prohibit the placing of poisoned flesh and poisonous matters in plantations, fields, and open places, and called

The Poisoned Flesh Prohibition Act, 1864.

Whereas it is expedient to extend the provisions of an Act passed in the Session of Parliament held in the 26th and 27th years of the reign of Her present Majesty, intituled "An Act to prohibit the Sale and Use of Poisoned Grain or Seed:" Be it enacted by the Queen's most excellent Majesty, by and with the advice and consent of the Lords spiritual and temporal, and Commons in this present Parliament assembled, and by the authority of the same, as follows:—

1. This Act may be cited for all purposes as "The Poisoned Flesh Prohibition Act, 1864."

2. Every person who shall knowingly and wilfully set, lay, put, or place, or cause to be set, laid, put, or placed, in or upon any land any flesh or meat which has been mixed with or steeped in or impregnated with poison or any poisonous ingredient, so as to render such flesh or meat poisonous and calculated to destroy life, shall, upon a summary conviction thereof, forfeit any sum not exceeding £10, to be recovered in the manner provided by the Poisoned Grain Prohibition Act, 1863: Provided always, that nothing herein contained shall prevent owners or occupiers of land in Ireland from laying or causing to be laid any poisonous matter as hereinbefore described, after a notice has been posted in a conspicuous place, and notice in writing has been given to the nearest constabulary station.

3. Nothing in this Act shall make it unlawful for the occupier of any dwelling-house or other building, or the owner of any rick or stack of wheat, barley, oats, beans, peas, tares, seeds, or of any cultivated vegetable produce, to put or place, or cause to be put or placed, in any such dwelling-house or other building, or in any enclosed garden attached to such dwelling-house, or in the drains connected with any such dwelling-house, provided that such drains are so protected with gratings or otherwise as to prevent any dog from entering the same, or within such rick or stack, any poison or poisonous ingredient or preparation for the destruction of rats, mice, or other small vermin.

4. This Act shall not apply to any grain, seed, or meal within the provisions of the Poisoned Grain Prohibition Act, 1863, and the provisions of the 5th section of the said Poisoned Grain Prohibition Act, 1863, shall apply to any proceedings instituted under this Act, and shall come into operation on the 1st October, 1864.

MISCELLANEA.

The Poisoning Ordeal of the Africans.—The recent case of poisoning by Calabar beans in Liverpool has brought into publicity the particulars of a strange custom which prevails amongst the natives on the west coast of Africa. The following interesting account of the ordeal is contained in a letter received from Mr. W. C. Thomson, of Glasgow, by Mr. James Irvine, of this town, and was written in order to furnish some reliable information regarding the bean that caused so much distress in Liverpool:—"The Calabar bean, as an ordeal, is given in various quantities, from below a dozen to over a hundred, but a very small portion—less than half—of a bean is sufficient to destroy life; while, on the other hand, entire dozens of the bean have been taken with impunity, being quickly rejected by the stomach and bowels. One bean halved between a brace of infatuated duellists, has cut both off; and a woman who was tried for witchcraft some years ago, and who must have taken some dozens in the process, was still living and in vigorous health last year. When used by duellists, it is customary for the challenger to bite a bean in two, consume his half, and hand the other to his opponent, who is obliged to eat it up. This is said to be a common thing among the Ibebios. When it is administered in public trial, the accused is compelled to eat up a few beans just as you see them, while others were being pounded to pulp in his presence. This is afterwards well mixed with water, and one part of the mixture given as a drink and the other administered in the form of an enema. If the poison so irritates stomach and bowels as to be completely ejected, which is often the case, the party escapes and is pronounced innocent; if not, he dies, and is therefore guilty. The plant grows to a large size, one plant climbing sometimes over several trees, and almost entirely enveloping them in its foliage. It is often to be met with on the banks of the Calabar river. The flower is not unlike that of the sweet pea."

Poisoning by Laudanum.—On Monday, August 15th, an inquest was held at the Town Hall, Lancaster, on the body of Thomas Wilson, 15 weeks old, who died from the effects of laudanum contained in some syrup of rhubarb, administered by his mother, who stated in evidence that the child being very cross, she sent to Mrs. Cooper, who keeps a druggist's shop, for "a pennyworth of syrup of rhubarb, with a drop or two of laudanum." The quantity sent was about 2 teaspoonfuls, the whole of which was given to the child in two doses, in the morning, and about the middle of the day the child became very drowsy, and was carried by the mother to Mrs. Cooper, who advised that a doctor should be sent for immediately. Mr. Watson, surgeon, was accordingly called in, who used all the means in his power to revive the child, but without effect.

Mrs. Cooper, in her evidence, stated that she had put 15 drops of laudanum in the quantity of syrup of rhubarb given to the child; but that when she purchased laudanum, she "let it down" by adding 3 ounces of water to about 2 lbs., the quantity her bottle held. There was some discrepancy in the statement of the person who was sent for the mixture, and that of Mrs. Cooper; the former stating that she was told to give a teaspoonful, the latter asserting that she said half a teaspoonful.

The Coroner in summing up quoted from Dr. Taylor's 'Medical Jurisprudence,' to show how liable infants were to be affected by very small doses of opium, and cases were mentioned—one, a child 4 months old, was nearly killed by the administration of 1 grain of Dover's powder; another child, 4½ years old, died from the effects of 4 grains of the same medicine; also, one of a child 9 months old, to whom 4 drops of laudanum were fatal. In conclusion, he observed that as Mrs. Cooper, so to speak, dealt in the health of Her Majesty's subjects, she was bound to bring proper skill and knowledge to bear upon her business. If by negligence she had caused the death of the child, however painful it might be to the jury to do so, they would return a verdict of manslaughter. The jury, after a consultation of about two hours, returned the following verdict:—"The jury are of opinion that Thomas Wilson died from the effects of an overdose of laudanum, administered to him by his mother in ignorance; but that his death is attributable to the carelessness of Mrs. Cooper in dispensing poisonous drugs, she being wholly unacquainted with their nature and strength; we consequently return a verdict of manslaughter against Mrs. Cooper."

Mrs. Cooper was admitted to bail, herself in £50, and two sureties of £25 each.

Poisoning by Hemlock.—A lady and her two children, living at Litherland, were lately taken seriously ill soon after dinner. Medical aid was sought, when the symptoms were attributed to poison, and it was found that hemlock had been mixed with the herbs used for flavouring the soup, and, as the parsley had been gathered in the garden, it is supposed that hemlock seed had been accidentally mixed with the parsley seed when sown. The symptoms soon gave way to the remedies used, and the patients recovered.

Accidental Poisoning by Laudanum.—An inquest was held on Monday, August 8, before Mr. Coroner Swann, at Sneinton, near Nottingham, on the body of a child named Joseph Henry Ellicock, aged six months. It appeared from the evidence that the mother of the deceased sent a child for some Godfrey's cordial, but she asked for laudanum by mistake. The druggist's assistant put a label of "poison" on the bottle, but the mother not being able to read, gave the child a portion of it, and death was the result. The verdict was, "Death from laudanum, administered in mistake for Godfrey's Cordial." The coroner and the jury expressed an opinion that there had been great carelessness in the matter by all the parties concerned.

Accidental Poisoning by Corrosive Sublimate.—On Friday, July 26, Miss Lydia Hale, of Chichester Place, Bayswater, expired from the effects of a solution of corrosive sublimate, which she took in mistake for camphor julep.

BOOKS RECEIVED.

Die Merkmale der Aechtheit und Güte der Arzneistoffe des Pflanzen- und Thierreichs, nebst Anleitung zur Prüfung derselben auf ihren Gehalt an wirksamen Bestandtheilen, zugleich ein Leitfaden bei Apothekenvisitationen. Von Dr. J. B. Henkel, Prof. der Pharmacie, Pharmacognosie und medicinischen Botanik zu Tübingen. Tübingen, 1864. Verlag der H. Laupp'schen Buchhandlung,—Laupp and Siebeck.

TO CORRESPONDENTS.

Patent Medicine Licence.—We remind our readers that this Licence becomes due on September 1st, and should be paid within thirty days of that date.

Intending Pupil (London).—Fownes's 'Chemistry;' Möhr and Redwood's 'Pharmacy;' Bentley's 'Manual of Botany.'

Leptandra (Manchester).—Professor Bentley's papers on "New American Remedies" will be shortly resumed.

Brit. Pharm. (Bristol).—See "Lectures on the British Pharmacopœia," by Professors Redwood and Bentley, and Dr. Attfield, in the March, April, May, June, and July numbers of the 'Pharmaceutical Journal' of the present year.

A Junior.—When *Liquor Antimonii Tartarizati* is ordered, that made with spirit, according to the Dublin Pharmacopœia, is intended; but if written with the letters "P. L." affixed, that made with wine should evidently be used.

Chemicus.—They are practically the same.

Chemicus (Aberdeen).—(1) We believe there is no such intention at present. (2) We have no recipe for that purpose. (3) Apply to the Secretary.

Mr. Long's communication has been received, but he has evidently misunderstood the subject.

A Registered Apprentice (Cork).—Fownes's 'Chemistry;' Garrod's 'Essentials of Materia Medica;' and Bentley's 'Manual of Botany.' Write to the Secretary of the Pharmaceutical Society, and he will forward you all the Regulations, etc., of the School and Board of Examiners.

Pharmaceutist.—*Datura Tatula* has similar properties to *Datura Stramonium.* It is generally regarded as a distinct species, although probably only a variety of *Datura Stramonium.*

A Lover of Justice (Liverpool) *and S. J. Weston* (Paris) are thanked for their communications, which will receive notice in our next number.

W. G. Hayward (Reading).—There is no recognized formula for *Tinctura Podophylli.*

Chemicus (Canterbury).—Henfrey's 'Rudiments of Botany.'

Instructions from Members and Associates respecting the transmission of the Journal before the 25th of the month, to Elias Bremridge, Secretary, 17, Bloomsbury Square, W.C.

Advertisements (not later than the 23rd) to Messrs. Churchill, New Burlington Street. Other communications to the Editors, 17, Bloomsbury Square.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VI.—No. IV.—OCTOBER 1st, 1864.

THE SIXTH REPORT OF THE MEDICAL OFFICER OF THE PRIVY COUNCIL, WITH APPENDIX.

Embodied in a "blue book" bearing the above title, we have one of the most important documents concerning "Poisoning, and the *Dispensing*, *Vending*, and *Keeping* of Poisons," which has for many years appeared; it will be read with interest by all chemists, with surprise by many, and seems to be big with the fate of pharmacy.

Mr. Simon, under instruction of the Lords of the Privy Council, proceeds first to ascertain to what extent accidental or criminal poisoning causes death in England, and what security the public enjoys against an indefinite multiplication of such cases of poisoning. He puts down the suicides by poison during a period of four years at 509, the deaths by accidental poisoning in the same period 1059. Thus far the report proceeds on certain data, and then, diverging to conjecture, presumes "a considerable though not ascertained proportion" of the 1380 murders occurring in four years to have been committed by poison. We think it would have been better, and quite easy, here to have given the exact number. On his next point, some of our readers will be inclined to dispute the conclusion that many accidental cases of poisoning occur and are not distinguished from deaths by natural causes.

It is however most important to consider how far *carelessness* and *incompetence* exist among dispensers of medicine, with a view to remedying the evil; and to what extent unnecessary facilities are given for the purchase of poison for criminal purposes, or rather to what extent those facilities could be abridged without inconvenience to the public.

The assistance of Dr. Taylor having been called in, he has handed a very lengthened report to the Medical Officer, opening at once with the indisputable assertion "that a large number of persons wholly unacquainted with the properties of powerful drugs and medicines are allowed to retail them to the public, on demand, without any check or control." He then cites many accidents which have arisen from this cause, frequently referring to the reports contained in former numbers of this Journal for authority. Dr. Taylor bears testimony to the desire of respectable druggists, both in town and country, to throw "every impediment in the way of the purchase of poison," but dwells largely on the careless custody of poisons as a fertile source of danger to the public. Our readers will have the opportunity of judging for themselves how far, as a body, druggists are open to animadversion on this point; but there is one thing we cannot pass without notice, namely the alleged practice of trusting rather to the position of the bottle on its shelf than the label it bears as to the nature of its contents.

We have seen lamentable instances where the result has seemed to justify such an inference,—some indeed where the word "Poison," in addition to the name of the article, has been apparently disregarded—and we confess that we tremble for the result when we think of a dispenser who can, under any circumstances, weigh or measure from a bottle without first reading its label. This is just the kind of carelessness which men of the greatest experience, when discussing the merits of "Poison Bills," have believed would be increased by cunningly-devised bottles. A dispensary contains so many poisons, that poison-bottles must be common therein. Morphia is a poison, so is strychnia, so is aconitine; but there is as much care required in distinguishing between these three medicines as between tincture of opium and many other tinctures of the same colour and appearance. The label only must be the dispenser's guide, however much poisons, as a class, may be hedged about with further precautions.

Dr. Taylor concludes with certain suggestions, which in the main are doubtless good, for diminishing the evils he has been considering. He commences with the one broad and important provision, "That none but qualified persons, educated to the trade of druggists, should be allowed to vend by retail drugs or medicines capable of acting as poisons."

This is but an extension of the principle set forth in the Pharmaceutical Society from the beginning, and acted upon continuously, *that the public safety should be secured and the status of the trade advanced, by the requirement of a certain educational qualification of those who intend to practise Pharmacy.* Suggestion 2 may seem unnecessary if No. 1 be enacted; 3 is a due acknowledgment of this Society and testimony to its usefulness; but here the difficulty of schedules will come in, as it always has done when legislative enactments have been proposed, and the impossibility of making a catalogue of "noxious substances, SUCH AS" seems almost insurmountable. The labelling is but enforcing a practice which is invariable with all careful druggists at present. Provisions for age on the part of dispensers are wise and possible, not so the requirement that buyers shall bring proof of being twenty years old; that is a point which must, and may safely, be left in the hands of the properly qualified vender.

We bring this report prominently before our readers, because it treats of subjects of considerable interest and anxiety to our whole body—such anxiety as none but those engaged in the daily practice of pharmacy can appreciate. Those who have taken an interest in the proposed legislation affecting pharmacy, will hail it as another aid in the right direction, and an assurance that our course has hitherto been wise; it is another recognition of our Society, which up to this time has had only power to give a distinctive title without trade privileges, and an evidence that men in a position to form a sound judgment are prepared to take that Society as a means already in existence to ameliorate existing evils.

It is true that our proposed extension of the Pharmacy Act contains no sale of poisons prohibition clauses; but it is equally true that some of the persons acting on the Committee which framed the new Bill, as well as those indeed who prepared the first Pharmacy Bill, were fully impressed with the necessity of adding them, and were only deterred by the fear of risking what may be called an *educational* measure by the introduction of regulations belonging in some sort to *police.* It will be better in many respects that the demand for such provisions should come from without, and our wisdom will consist in complying with that demand.

BRITISH PHARMACEUTICAL CONFERENCE.

The Pharmaceutical Conference at Bath, of which a full report will be found in another part of this Journal, has been attended with at least as much success as its best friends had any right to expect. The meetings extended through four days, and a considerable number of communications were read, the purport and character of which may be judged from the abstracts we have given. The attendance was by no means bad, for we know how reluctant chemists and druggists are to leave their shops with the heavy responsibilities that rest upon them, and recent events will have added to this feeling. In addition to the druggists of Bath, who may be looked upon as the hosts, there appear to have been twelve members of the Conference from London, three from Liverpool, and sixteen from other parts of the country. We might, it is true, have expected a larger attendance from Bristol, but, on the whole, the result must be considered to have been a decided success. We are glad to observe that many of the communications have been contributed by provincial chemists, and especially that several of them are from places where no associations exist for promoting and encouraging scientific investigation. It is by inducing our brethren in different parts of the country to look beyond the mere drudgery of trade, to accustom themselves to the investigation of phenomena which are frequently coming under their observation, to confer together on the results of these investigations, and thus to cultivate a love for science and mutual friendship one with another, that these provincial meetings may be made most useful. In carrying them out in the form of a new institution, it is to be hoped that care will be taken to weaken as little as possible the means of support of previously existing local associations having similar objects. This is an evil which in many cases has been severely felt, from the long-existing tendency to split up societies into associations having special and limited objects, for which there is often barely matter enough to maintain the interest of their proceedings.

The President's address, and the report on the prevention of accidental poisoning, are the only communications read at the meetings that we have received otherwise than in abstract. Some of the scientific papers are on interesting subjects, and we hope to have the means of publishing these more fully than is done in the brief abstracts contained in the report.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *7th September*, 1864,

Present—Messrs. Bird, Bottle, Davenport, Deane, Hanbury, Morson, Orridge, and Standring,

Davids, George Ware........................Hackney,

was elected a Member of the Society.

The Report of Professor Bentley on the Herbaria presented for competition was read, and awards were made of a Bronze Medal and Certificate of Merit.

The Report of the Examiners on the competition for the Minor Examination Prize of Books to the value of two pounds was read, and the award made to the successful candidate.

These prizes will be distributed at the evening meeting on the 5th October.

BRITISH PHARMACEUTICAL CONFERENCE.

BATH MEETING, 1864.

The first sitting of the Conference was held on Wednesday, September 14, 1864, at 41, Milsom Street, Bath, at 10 A.M.

The members present at this and subsequent sittings included Messrs. H. Deane, F.L.S.; Daniel Bell Hanbury; Daniel Hanbury, F.L.S.; J. C. Brough; S. Gale, F.C.S.; W. E. Heathfield, F.R.G.S.; J. Robbins; J. Wade; W. Symons, F.C.S; H. Hodge; H. Matthews, F.C.S.; and Dr. Attfield, F.C.S.,—of London: H. B. Brady, F.L.S., of Newcastle: R. Reynolds, F.C.S., of Leeds: S. U. Jones, of Leamington: T. B. Groves, F.C.S., of Weymouth: W. Groves, of Blandford: J. Abraham; N. Mercer; and Dr. Edwards, F.C.S.,—of Liverpool: W. Hearder, of Torquay: J. Leay, of Chilcompton: R. W. Giles and G. F. Schacht, of Clifton: F. C. Clayton, of Kelvedon: Dr. Parkinson, of Bradford: A. P. Balkwill, of Plymouth: W. W. Stoddart, of Bristol: F. W. Joy, of Cardiff: W. A. Hope, of Wellingborough: F. Roberts, of Stroud: and F. Barnitt, W. Bright, W. Clatworthy, R. Commans, C. Ekin, R. O. Harding, T. Harding, W. C. Jameson, F. W. Kent, J. R. King, J. H. Marsh, J. Merrikin, F. Nurthen, M. Parker, J. C. Pooley, H. Rickwood, J. P. Tylee, and W. Walker, —of Bath; and many other gentlemen whose names could not be ascertained.

The President, H. Deane, Esq., F.L.S., delivered the following address:—

It must necessarily be a somewhat embarrassing task to take the chair at a first meeting of this sort. In an older Association, after a few gatherings have taken place, a President might, by consulting the conduct of his predecessors by walking in the line of their successes as far as lay in his power, and avoiding the shoals on which they might have foundered, possess a fair chance of steering his course to a happy result. As it is, my one advantage is that there is no standard for comparison, though I might perhaps add to it the confidence which is inspired by the kindly feeling of those who have placed me in the position I occupy.

I need not enter into the history of the causes which have led to our meeting here. It was a happy thought of those who were instrumental in the organization of this little body, that something might be done towards the promulgation of brotherly feeling and sympathy, not less than towards the advancement of pharmacy, in a way which could scarcely be compassed by any existing society; that an Association might be formed in which a social element might be combined, meeting in different parts of the island so as to give all interested in its objects an opportunity for co-operation, and labouring systematically towards the end in view, yet still free from the drawbacks of a complicated constitution and expensive working. The experiment was not an untried one; our brethren on the other side of the great Atlantic had weighed the scheme in the balance of practical experience, and had not found it wanting. And without unduly exalting their example or depreciating our own powers, we may point to many of the researches which have been made under their auspices as patterns which we shall do well to imitate. That the profession in which we are all interested is in some of its conditions different from its corresponding transatlantic development is a fact which speaks only in the favour of a principle so elastic. If, as some think, we in this country are more divided amongst ourselves, more split up into sections, each section with a different interest, and pursuing it in a diverging line, it is all the more important that a body of neutral politics, open to all, should exist, to bind together the links that ought to form one chain. It seemed to me that this increase of fellow-feeling, of sympathy in its best sense, was no small object at which to aim; but I confess my views did not go further than the boundaries of our own kingdom. It seems that a still wider prospect is open to us, and that we are to become the means of a manifestation of the same idea as relating to two continents. A letter will be laid before you from the Secretary of the American Pharmaceutical Association. Through some accident the engrossed copy of the resolutions alluded to in it has not yet come to hand, but we have their substance in the resolutions recorded in the copy of their Transactions now laid on the table, which, for our purposes, will answer the same end; and I trust that you will see fit to direct that a reply be sent to these, expressing our high appreciation of the offers of friendly intercourse therein contained, and of our desire to move with them hand in hand towards the end we mutually have in view.

Gentlemen, since my youth I have taken, as some of you know, the deepest interest in the same objects as those for which the Conference is established, and when applied to to associate myself with others in its formation, I could only reply, that whatever service I could render them should be cheerfully given. It has pleased you to say that this would be best accomplished by my assuming the chair during this your first year, and however much I might doubt the wisdom of your judgment, I could but bow to the decision.

So many matters of vital interest to our profession have been mooted during the past year, that I could not attempt any succinct review of them without interfering with the important duties of the Conference: I shall therefore, with your permission, confine my remarks to two or three of the most important. Firstly, the national Pharmacopœia, which has appeared since our last meeting, a matter which some may think has already had ample discussion. Secondly, the state of the law with respect to accidental poisoning. As the last-named is a subject which will come more fully under your notice in the Report of the Committee which will be presented to you, I will reserve a portion of what I have to say to the discussion which may then take place.

In the first place, I may mention the publication of the new British Pharmacopœia, a work which, with many merits characteristic of advancement, has been attended with much disappointment and dissatisfaction on the part of those most interested in its appearance.

The necessity for one national Pharmacopœia in place of three distinct works issued at irregular intervals, and never simultaneously, by the three Colleges of London, Edinburgh, and Dublin, had been for many years a conviction growing and forcing itself upon all concerned in the dispensing of medicines. When in 1855 the Pharmacopœia Committee of the Royal College of Physicians of London requested the co-operation and assistance of the Pharmaceutical Society in the preparation of a new edition of the Pharmacopœia, the Society's committee then formed thought it highly important that an attempt should be made to induce the three colleges to unite and agree to publish their formulæ in one national undertaking, to be called the British Pharmacopœia, and accordingly our late lamented friend Jacob Bell, with his characteristic energy and determination, made several journeys to Scotland and Ireland, for the purpose of conferring with the leading men of those colleges on the subject, and after some considerable difficulty obtained something like a general acquiescence in the proposal. At the commencement of its labours the committee made out a list of all drugs, chemicals, and preparations contained in the Materia Medica of the three colleges, and had it printed and issued, with certain questions, to every member of the Pharmaceutical Society, with a view to elicit a correct knowledge of what medicines were in use, and to what extent, and what medicines were obsolete or nearly so. A large mass of evidence was thus obtained from all parts of England and Scotland, on the strength of which there was little difficulty in determining what should be retained and what omitted. The next step was to go through the preparations, with a view to revise where needful, to select the processes best calculated to produce the best results, to select the best formulæ where there were more than one under the same or similar names, and to leave the rest in their integrity, to meet the wishes of prescribers in each country; at the same time it was intended to add formulæ for every new preparation that could be said to be fairly established. The result would have been a very comprehensive work, adapted to all requirements, and interfering but slightly with the routine of medical practice or public demands and prejudices, with none, or very few, of those violent alterations which have taken us all by surprise in the book now before us.

No doubt those who have had the framing of the British Pharmacopœia have had many and great difficulties to contend with in the reconciling of prejudices; and in doing this, probably to a much greater extent than was desirable or necessary, a series of compromises has been made, breaking up many old-established and popular formulæ, and omitting others, whereby dispensers and venders of medicines are placed in a very false and difficult position, besides being involved in needless expenses to meet the new order of things. It must still however be borne in mind, and this does not seem to be generally understood, that many of the formulæ and preparations that stand so conspicuously before us now, are essentially Scotch or Irish, and, as such, are little more likely to be prescribed in England for a long time to come than they have hitherto been. In this respect we are more frightened than hurt, as will be rendered evident to any one who will take the pains to go carefully through the new book with the Pharmacopœias of Edinburgh and Dublin, and putting E. or D. against the respective formulæ.

The extensive alterations made in such old and popular remedies as Decoction of Aloes, Tincture of Rhubarb, Tincture of Senna, Confection of Senna, Infusions of Orange and Gentian, Ipecacuanha Wine, Liq. Ammon. Acetatis, etc. etc., are quite incomprehensible, and to many minds very pernicious and needless. The extracts, both solid and liquid, have had a large amount of labour bestowed upon them by the committee of the Pharmaceutical Society, who spared no pains to render their work complete and efficient. Much of their recommendation was adopted, and others altered, to meet the views and wishes of the medical profession. Indeed, every portion of the work has been attended with great labour and expense.

An attempt has evidently been made to render the tinctures more uniform in character and strength; but there are some curious inconsistencies, of which Tincture of Arnica, now introduced, is an illustration. The preparation is universally known, having been brought prominently forward by the homœopaths, and is made with one part of root to ten of rectified spirit; but the new Pharmacopœia tells us to use one in twenty! Why deviate from an established formula? Morphia lozenges, and morphia and ipecacuanha lozenges, which for many years have been made to contain $\frac{1}{24}$ of a grain, are now to be $\frac{1}{36}$. The change may be safe, but was it needed?

On the chemical portion of the work a great amount of skilful labour has been bestowed; still there is room for improvement, and much work is cut out for such members of the Conference as are willing to undertake it.

The alteration of the weights from troy to avoirdupois possesses two great advantages; first, that all confusion between the two weights is done away with, and secondly, in the circumstance of an ounce avoirdupois being just the weight of a fluid ounce of water,—but here the advantages end. The ounce of 437·5 grains not being divisible without inconvenient fractions, its practical utility is greatly diminished. Thus, $\frac{1}{2}$ drm., 30 grs., $\frac{1}{16}$ of an ounce troy, is much more convenient than $\frac{1}{4}$ of a quarter of an ounce av. = 27·3. Thus, anything like facile accuracy is almost impossible in many cases. The old weights of fractional parts of an ounce troy are ordered to be set aside, but their convenience and the facility with which they are used will never allow them to go out of use, and, the grain weight being the same, there is no necessity for it until a true decimal system be adopted. They are simply weights of so many grains, whose characters are easily written, and with no greater, perhaps less, liability to error than Roman numerals.

The introduction of the modified process of percolation and maceration in making tinctures, etc., is good, and likely to be more generally useful than a strict adhesion to simple percolation, which in many hands is difficult, and involves some curious errors of manipulation.

With regard to the omission of old-established formulæ for preparations, most of which are in constant use and demand, I cannot but express my regret, feeling, as I ever have done, that an authorized formula for every *established* preparation *in use*, whether by one section of the medical profession or another, or by the public, and whether they have ever been in a pharmacopœia or not, should form an integral portion of any national pharmacopœia. These omissions are much to be regretted, and are a source of much disappointment and dissatisfaction amongst a large number of our professional brethren.

The omission of doses, as authorized in the translation of the old Latin edition, too, is much more serious than the framers of the book are aware of, and may lead to disaster, when the dispenser can no longer correct the clerical errors of prescribers by some authorized rule or standard.

However, with all its imperfections, which fall heaviest on England, the new British Pharmacopœia has marked improvements, which place it far above all its predecessors. Let us make the best of it, and do all we can to promote and ensure an improvement in every future edition.

The next subject I have to refer to is one the importance of which to us, as responsible persons in the sale and dispensing of medicines, it is scarcely possible to overestimate. It is one so large, complicated, and difficult, that I am quite incompetent to lay it before you in that clear and logical matter it requires to impress you fully with its importance, and I am inclined to think it would be well for us to endeavour to fix on a day for its full and free discussion. At the present time, I will simply refer, in as few words as possible, to a recent disastrous case of poisoning at Liverpool, and leave the question of the sale of poisons, which arises out of that case, and the Report on Public Health, for future discussion.

The result of the trials on the late case, the acquittal of the assistant, who is supposed to have dispensed the medicine, from the charge of manslaughter, on the score of its being a pure misadventure, and the unavoidable compromise with the friends of the deceased,—show that every one of us is standing on a mine which may at any moment explode, and send us to pecuniary perdition and despair. It matters nothing what amount of care and expense has been bestowed on arrangements to secure the public from accident; it matters not that the proprietor of an establishment is in no way to blame, or that the patient has died through a pure misadventure,—the law requires that a jury *shall* award compensating damages to the injured family. We all know what that means to nineteen in twenty of those following the business,—it means *utter ruin*.

Allow me to state our case and position in society, as an important branch of what is called a liberal profession. In the first place—

All the responsibilities of professional men are laid upon chemists, without either the dignity or emolument. We are treated as shopkeepers, with profits less than those of an ironmonger.

Rich and poor of all grades do not hesitate to consult them in all sorts of difficulties, and obtain freely and gratuitously that for which a physician or consulting chemist would charge a handsome fee.

That the information thus freely accorded to all is truly valuable is proved by the fact of the constancy of the practice, and the needless jealousy of many professional men.

To obtain this amount of public confidence, a large expenditure of means, careful observation, energy, study, and integrity of purpose, are required.

The more extensive the business of a chemist, the greater the responsibility; but not so the profits.

When the public confidence is secured, it is the interest of the chemist to maintain it by all and every means in his power.

Foremost amongst the means are the obtaining good assistants, and making such arrangements in the establishment as shall, as far as practicable, obviate all chances of accident, and ensure the detection of errors, and the sources of them. Having done this, and exercising constant watchfulness, all that a man can do has been done. Proof of successful care is shown in the small number of known errors made by dispensing chemists.

Thus, a man may dispense 50 prescriptions daily, on an average of 300 days in a year, equal to 15,000 prescriptions, each of which will average 10 doses, or 150,000 doses annually! He goes on thus for many years, and never has the faintest trace of an accident arising from any fault or oversight of his own, and for which he rarely gets a fair share of credit. But during those years he has probably corrected numberless errors of prescribers, many of them of no trivial nature; but for this he has no credit, professional etiquette requires he should be silent. If the skill and foresight of the dispenser were not habitually turned to such contingencies, serious accidents would frequently be recorded. Hence, the educated and careful dispenser, in the exercise of his skill, tact, and judgment, in avoiding the dangers incidental to his grave and responsible duties, is a benefactor to the community, and deserves better pay and higher consideration than the world is disposed to give. Yet a man, though gifted with clear intellect and sound discretion, and possessing a thorough knowledge of his business or profession, cannot after all claim exemption from that common imperfection of humanity—fallibility, and is not a bit less liable to error than the professedly more highly educated man who writes prescriptions, or the patient who carelessly takes up an opium liniment, and swallows it for a black draught, without exercising that common sense which we may safely state is the only true preventive of such accidents.

No regulations could be devised nor Act of Parliament enforced to prevent a physician from making a wrong mark, which might lead to fatal results, nor prevent the recurrence of such facts as the following.

A lady of our acquaintance lately took into her hand an *oval*, *fluted*, *half-pint* bottle of chloride of zinc, having thereon a large *red label*, and *Poison*, *in large red letters*, on the top of the bottle, and took a dose therefrom, instead of from a *round pint* bottle, having a *small plain label*, which she had used for two years for a soothing syrup in daily and frequent use.

Another lady of our acquaintance went to a cupboard where medicines are kept on a middle shelf to procure a dose of fluid magnesia, but instead of taking the proper bottle standing before her face, got a chair and took a bottle of chloride of zinc from a distant corner of a top shelf, and, in spite of the *red label* and the word *Poison*, took a dose, which killed her in a week.

Such cases can be quoted by the dozen, together with numberless little inexplicable instances in daily life, of temporary absence of common sense, which serve to prove the frailty of human nature, and how powerless are all rules and regulations must be to prevent their recurrence entirely.

The case at Liverpool brings all these considerations before us in the most vivid manner. No men amongst my acquaintance in the profession have taken more pains to render their dispensing establishment a model one than the defendants; none can take more pains to secure good assistants than they have done; yet a calamity has fallen upon them in a most inexplicable manner. A customer dies from the effects of a dose of strychnia, supposed to have been supplied instead of James's Powder, from their pharmacy. The assistant who compounded the prescription is tried for manslaughter, and acquitted, because it was a *mischance*,—a just verdict. His principals are sued for damages, laid at £10,000! which they were preparing to defend, when it was discovered the law, as laid down in "Lord Campbell's Act," compelled the jury to award damages in compensation to the friends of the deceased. Thus in the operation of an unjust law, the proprietors of an old establishment, as perfect as human forethought could make it, and who were perfectly innocent of the death of their customer, were forced to compromise the affair by paying £1500 to the widow and children, and £500 or £600 for law expenses.

Is a man to suffer destructive and ruinous spoliation because his assistant is not more than human? It is monstrous injustice. Who is safe amongst us if a ruinous prosecution is to follow an accident, however sad and fatal it may be, which may any day occur to any one of us,—a class of men proverbially and necessarily careful for their own existence' sake? And who will enter a profession liable to such fatal responsibility?

A general practitioner may, and does, make numberless mistakes with impunity, because the facts are confined to himself and his own surgery. The eyes of the physician and the public are not on him or his dispenser, to stimulate to vigilance and care; thus few accidents under such circumstances ever see the light, and perhaps it is well it should be so. But cases do occasionally come before the public which contrast most favourably for the order and care exercised in every well-regulated pharmacy.

The prosecutor in the Liverpool case was probably led away by the popular delusion that every chemist's profits are enormously large, and that they must of necessity get rich out of the public,—not being aware that one-half of the chemists in the country do not, as a gross return, take 20*s*. per day, or £365 per annum; and that the net profit earned by the other half little more than sufficed to keep soul and body together. Very few save anything, and fewer still enough to retire upon in their old days. It is questionable whether one in a thousand can save, by the legitimate exercise of his business in the course of a laborious life, so much as £10,000. And if a man in the course of an honourable and useful career has saved as much or more, it is no reason why he should be robbed of the same, and simply because he has it; for a man known to be poor would not be prosecuted.

Although it is now shown that the law makes the employer of an assistant responsible for the acts of the latter, I am at a loss to conceive on what principle of justice it is so, when it can be shown that no pains have been spared to prevent accidents. If the assistant were a lifeless machine of man's construction, and a man the worker of it, I can well understand how he would and might be solely responsible for the lives of all risked by its use. Again, it seems a monstrous thing that the only guilty party should be acquitted, and the perfectly innocent employer mulcted of £2000,—a sum that it would probably ruin three-fourths amongst us to have to pay. Every one henceforth will be in constant danger and dread of some calamity befalling him, which may at once reduce him from a position of honour and comfort to one of perfect destitution and misery. Without some change in the law, this must ultimately lead to the abandonment of the profession by educated and high-minded men, and their places taken by others, ignorant and reckless, and thus public safety will be jeopardized. The twelve pence now demanded for as many doses of pills, can only be adequately replaced by a sum equal to the fee of the prescriber, for it is clear we have the responsibility of two professions on our shoulders, which ought in common justice to be paid for.

For some admirable remarks on this case, I may refer you to the 'Liverpool Daily Post,' of August 16th last, where you will find much that I have said, and a deal more, stated in the most lucid and forcible manner; and it will be seen how unjustly Lord Campbell's Act may be brought to bear upon a particular class of the community, and in cases where it could never have been intended it should take effect. I cannot refrain from quoting one passage, for reasons which I will not record here:—"Nay, more unlikely things have happened than for a man to commit suicide after surreptitiously mixing poison with a dose from a chemist, and so virtually bequeath to his family the damages obtainable by an action under Lord Campbell's Act. The deed is an unlikely one; but as the Insurance Companies deem it worth while to except suicide from the causes of death allowed by their policies, our supposition is not beyond the bounds of possibility."

I must now conclude; but it would be wrong in me to resume my seat without saying how greatly we are indebted to our members in this city, and especially to our local secretary, Mr. Pooley, for the energetic kindness they have displayed in welcoming the Conference on the present occasion, and in making arrangements not only for the comfort of the members, but for the convenience of the meetings. I am sure we all feel how much we owe to them in this matter.

And now, Gentlemen, I must bring these remarks to a conclusion. The subjects which will be brought before you for consideration and discussion will be many and various. In scientific subjects, and in matters of fact, the end of all discussion is simply the elucidation of the truth; but there are other questions which may come under your notice, in which the balance of opinion must hold the sway; and with respect to the discussion which may take place in this room, you will perhaps not consider me sermonizing if I quote the words of a great man, spoken, it is true, with reference to religious matters, but none the less applicable in their spirit to those of secular bearing:—"In essentials, *unity;* in non-essentials, *liberty;* in all things, *charity.*"

On the motion of Mr. Tylee, seconded by Mr. King, the best thanks of the Meeting were offered to the President for his able and opportune address.

Dr. J. B. Edwards presented a resolution of the Liverpool Chemists' Association, expressing a warm interest in the objects of the Conference, deputing Mr. Abraham and himself to act as delegates, and offering a welcome to the Association whenever it should think it desirable to visit Liverpool.

The Report of the Executive Committee was read as follows:—

"REPORT OF EXECUTIVE COMMITTEE.

"At this, the first Annual Meeting of the Conference since its formation at Newcastle-upon-Tyne, your Committee have but a very short Report to lay before you. Its first business consisted in issuing a general circular of invitation to membership, accompanied by an account of the establishment of the Conference. Upwards of one hundred and fifty gentlemen responded to that invitation, and have been enrolled as members;

a list of them is in your hands. The Committee next drew up a list of subjects requiring investigation, and requested members to accept one or more and report thereon to the Annual Meeting. The result is that twenty-eight papers have been received —every one of considerable pharmaceutical interest; they will be read to you at the present and subsequent sittings of the Conference. In addition to the papers, a Report of the Sub-Committee appointed to consider the best means of preventing accidental poisoning will be brought before you."

Its adoption was moved by Mr. Jones, seconded by Mr. Bright, and carried.

The Treasurer's statement of accounts was presented and accepted.

The Treasurer in Account with the British Pharmaceutical Conference.

Dr. *Account made up to August* 31*st*, 1864. *Cr.*

Dr.	£	*s.*	*d.*	Cr.	£	*s.*	*d.*
To 108 Subscriptions for the year 1863–4	27	0	0	By Account for Printing	10	17	6
,, 45 ,, ,, ,, 1864–5	11	5	0	,, ,, Stationery	3	1	9
				,, ,, Postage	7	8	3
				,, ,, Advertising	3	8	6
				,, Expenses connected with Preliminary Meeting at Newcastle	2	9	0
				,, Petty Disbursements	0	7	4
				,, Balance in hand	10	12	8
	£38	5	0		£38	5	8

1864.	£	*s.*	*d.*
August 31st, Balance in hand	10	12	8
22 Subscriptions for 1863–4 (still unpaid)	5	10	0
110 ,, 1864–5 ,,	27	10	0
	£43	12	8

Audited and found Correct,

R. D. COMMANS,
CHARLES EKIN.

BATH, *September* 12*th*, 1864.

Dr. ATTFIELD introduced the Papers which had been sent in by reading one "On the Extraction and Preservation of Aromata," by Mr. C. R. Tichborne, F.C.S.:—

"ON THE EXTRACTION AND PRESERVATION OF AROMATA. BY C. R. C. TICHBORNE, F.C.S., CHEMIST TO THE APOTHECARIES' HALL OF IRELAND.

[*Abstract.*]

"Observing the preservative powers of glycerine for vegetable substances, the author packed different kinds of scented flowers in jars, and covered them with glycerine. In this way he had kept some for two years. If flowers, etc., so preserved be pressed, it is found that the glycerine has absorbed all the volatile oil, and when diluted and distilled furnishes a water in all cases superior to that from flowers preserved by salt. If the odoriferous glycerine be diluted and agitated with oils or fat, ointments, etc., of excellent quality are produced. In all these cases the glycerine is recovered by mere evaporation of water from it. The delicate oils of orange, jasmine, heliotrope, etc., are best isolated by steeping the flowers in the glycerine, pressing, and again steeping more flowers, and so on; finally diluting with water and shaking with chloroform, which removes the oil. The low boiling-point of the chloroform admits of its being separated from the oil by a temperature which does not injure the oil."

Mr. D. HANBURY remarked that the objects of the author were divisible into two classes, firstly, the preparation of distilled waters, and secondly, that of the more delicate volatile oils. He feared that the cost of pure glycerine and the difficulty of recovering it would prove serious obstacles to such a process. For the second purpose that had been named, a better method was required than the system of *enfleurage*, now in use in the south of France, etc. His friend Dr. De Vry, when travelling in Java, had extracted the delicate odoriferous principle of some species of jasmine, *Pandora odoratissima*, etc., and by the use of ether got minute quantities of butyraceous volatile oils. It would be an important desideratum if this method would answer in such cases, and he (Mr. H.) was satisfied that it well deserved more extended investigation.

Mr. REYNOLDS had found that the quantity of chloride of sodium in elder-flower water made from salted flowers was almost infinitesimal, and not to be determined quantitatively. The superior quality of water so made could not be doubted.

Mr. Abraham said that the desirability of using pickled elder-flowers in order to obtain a water of good keeping properties was incontestable.

Mr. Pooley remarked that the odour of this water was finer than that from the fresh flowers.

"ON COMMERCIAL CARBONATE OF BISMUTH. BY MR. C. UMNEY.
[*Abstract.*]

"Commercial carbonate of bismuth having been suspected to be contaminated by basic nitrate, the author had analysed six samples, and gave in his paper the numerical results. In one case no nitrate was present, and the other five contained but small and probably accidental quantities.

"In preparing carbonate of bismuth, by precipitating a solution of the nitrate by an alkaline carbonate, carbonate of soda was preferable to that of potash, but carbonate of ammonia with subsequent ebullition yielded the purest precipitate."

"ON THE PHARMACEUTICAL APPLICATIONS OF GLYCERINE.
BY MR. F. BADEN BENGER.
[*Abstract.*]

"In this paper a short history was given, and a *résumé* of its applications in pharmacy. The preparations known as 'plasma,' in which glycerine with starch is substituted for lard, as a basis of ointments, had been made the special subject of experiment by the author. He had found *tous-les-mois* starch superior to any other in making the simple plasma. Fifty grains of *tous-les-mois* were to be rubbed with one ounce of glycerine, and the mixture heated to 240° for a few minutes or till it became translucent. He thought that plasma might replace lard in ointments having a tendency to become rancid, but its relatively great expense would preclude its general adoption. The glyceroles, or solutions of different substances in glycerine, were then noticed. A good 'tincture of myrrh and borax' could be made by dissolving one part of borax in two of glycerine, and adding tincture of myrrh. As substitutes for syrup, the glyceroles did not appear to possess any superiority. Its use as an excipient in pill-making was strongly advocated."

The President referred to a series of experiments upon plasmata, a variety of which were prepared and put away in jars, but in a few months all the specimens were mouldy. The use of glycerine as an excipient for pill masses must be extremely sparing, or the pills would lose their shape.

Mr. Abraham said that glycerine had the property of irritating the skin to some extent. On behalf of the class of fatty preparations condemned by the author of the paper, he thought that the blame more properly attached to their faulty manipulation. They need not necessarily become rancid, and he thought the chief reason why they did so was because the lard was not freshly rendered.

Glycerine had been used for dissolving the extract of Calabar Bean in use in ophthalmic medicine, but here the glycerine irritated the eye.

Mr. Brady alluded to a preparation of tar that had been used in France, and which might be considered as a glycerole of tar, though its mode of preparation was unknown. He had made a somewhat similar and very satisfactory compound by the use of starch and glycerine.*

Mr. Walker had employed an essential oil for dissolving tar, with satisfactory results.

Mr. D. Hanbury had the authority of ophthalmic surgeons for saying that glycerine produces smarting when applied to the eye. In order to dissolve the extract of Calabar Bean the glycerine must be strong, and it was then an efficient solvent of nearly the whole. The addition of water precipitated this solution.

Mr. Ekin, on the authority of Mr. Benger, stated that some foreign glycerine, when diluted, became acid very soon, which was not the case with Price's.

Mr. Reynolds had found some of the better foreign glycerine to have a faintly alkaline reaction when received, and it gave off a volatile principle when warmed, leaving ultimately an ash of ·3 per cent., which contained chlorine, lime, alumina, etc.

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* Pharm. Journ., 2nd ser. vol. iv. p. 127.

"ON THE APPLICATION OF DIALYSIS IN DETERMINING THE NATURE OF THE CRYSTALLINE CONSTITUENTS OF PLANTS. BY J. ATTFIELD, PH.D., F.C.S., DIRECTOR OF THE LABORATORIES OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

[*Abstract.*]

"The author had dialysed a few plant-juices, the first that came to hand, and from each had obtained some of the crystalline constituents. The tops of the common potato yielded a crop of nitrate of potash, some cubes of chloride of potassium, hexagonal crystal not analysed, sugar, and an ammonia salt. The deadly nightshade gave nitrate of potash, an unknown magnesia salt in square prisms, sugar, etc. Pea-pods yielded only sugar. The common garden lettuce contained nitrate of potash, tetrahedra of undetermined composition, sugar and ammonia. Cucumbers furnished sugar, ammonia, and sulphate of lime. The cabbage also furnished sulphate of lime and ammonia. Stramonium contained so much nitrate of potash, that dried portions quite deflagrated on being ignited.

"From these experiments the author thought the proposed application of dialysis promised to be of great service, directly and indirectly, in investigating vegetable physiology."

In reply to Mr. Groves, who inquired if any of the alkaloids had been detected, the author said that traces of crystalline principles which were not referred to any particular substance were seen, and these possibly were natural salts of the alkaloids. Much larger quantities of material would be needed for their discrimination, and even then the relatively large amount of the colloid as compared with the alkaloid would make the complete isolation of the latter a doubtful problem.

Dr. EDWARDS was disappointed in the results of the application of dialysis to toxicology, from which much had been expected. If the process was continued for a length of time, portions of the colloid were transmitted through the membrane, and vitiated the result.

Mr. BROUGH observed that such a condition was inevitable, since there was no absolute line of demarcation in the transfusion of colloids and crystalloids.

"ON THE PURITY OF FOREIGN IODIDE OF POTASSIUM. BY F. C. CLAYTON.

[*Abstract.*]

"The high price and large consumption of this article has made it one which the manufacturer has special temptations to adulterate. Of late years very large quantities of foreign make have found their way into our markets, giving rise to keen competition, which, in the case of drugs, is often far from improving their quality. From these considerations we might still expect to find much that is impure, but the results detailed below lead us to a different conclusion. The impurities of iodide of potassium are bromide and chloride of potassium, and sulphate, iodate, and carbonate of potash. Moisture in excess is also to be considered an impurity, for, besides giving the sample a greater liability to deliquesce, it shows an article of imperfect manufacture. The first-mentioned adulterant, though it has at times been frequently used, has in none of the 15 samples experimented upon been found, and the second only in quantities from 3·7 per cent. down to minute traces. Sulphate was never found in ponderable quantities, and iodate in only 3, all of which, however, were of foreign manufacture. (Several English samples were analysed for the sake of comparison.) In these three cases it never amounted to 1 per cent. Carbonate, though more generally present, never amounted to 1 per cent., generally much under this. From these results, it will be seen that the iodide of potassium now in the market is practically pure, the percentage in all the samples being over 95."

Mr. D. HANBURY remarked that sulphate of iron was a much more delicate test for the presence of carbonate of potash than was lime-water. If so examined, he thought that few samples would be found free from carbonate. Iodide of potassium had sometimes been prescribed in combination with several saline sulphates at once, as soda, magnesia, etc. In such cases, no trace of carbonate was admissible, or a precipitate is formed.

In reply to a remark that syrup of iodide of iron would also be decomposed by traces of carbonate present in iodide of potassium, Mr. H. said that the influence of the sugar would prevent such a reaction; in fact, Liquor Potassæ would not decompose the diluted syrup.

Medical authority had stated iodate to be a serious contamination, very small doses of it producing inconvenient symptoms. The author of the paper had sought for the presence of bromide; it was quite as desirable to look for iodide in commercial bromide of potassium, and this was easily done by the starch and chlorine test.

"ON A TEST FOR METHYLIC ALCOHOL IN PRESENCE OF ETHYLIC ALCOHOL, WITH REMARKS ON METHYLATED SPIRIT. BY MR. JOHN TUCK.

[*Abstract.*]

"After referring to the value of methylated spirit and the composition of wood naphtha, the author stated it to be his opinion, that wood naphtha, once mixed with spirit of wine, could not again be separated; and that, though the characteristic odour of methylated spirit could be removed, yet the process required such cumbersome apparatus, that its use would certainly be followed by official detection. Seeing, however that the illegal process might possibly be employed, and the revenue be thus defrauded, and the inodorous methylated spirit be used in pharmacy and in concocting liqueurs, he had searched for a test, whereby even the deodorized naphtha could be detected, when mixed with spirit of wine. Such a test he had found in an alkaline solution of the double iodide of potassium and mercury. On boiling a few drops of this with pure spirit of wine, a yellowish-white precipitate was formed; but when methylic alcohol was present no such precipitate occurred. Details of the application of the test were then given. In testing flavoured spirits, tinctures, etc., it would probably be desirable to distil the suspected liquid, and apply the test to the distillate. The author added that, since completing the paper, he had found that acetone was the principle which prevented the formation of a precipitate by methylated spirit."

Mr. T. B. GROVES wished to inquire if volatile oils would produce the same effect as acetone.

Mr. TUCK had not tried the experiment, but would do so in the meeting. It was found that oil of cloves had the same influence.

Mr. REYNOLDS thought that the mercurial test now suggested gave the same reaction as that which Mr. Emerson Reynolds proposed last year, but which it had been shown was entirely unreliable in the presence of such derivatives of alcohol as are found in sweet spirit of nitre, or equally of volatile oils. Looking at the practical relations of methylated spirit to pharmacy, he maintained that it led to gross abuses, and no greater service could be rendered to our body than by supplying a good test for detecting it. He regretted that this practical end could not yet be considered as accomplished.

Dr. PARKINSON said there was no doubt of the annoyance caused by the introduction of this spirit, but he thought that the public were not now so easily misled by it as was the case at first.

Dr. ATTFIELD, Mr. POOLEY, and Mr. BRADY expressed their sense of obligation for the author's labours in so important a field, and hoped he would continue his experiments.

"REPORT ON THE WEIGHTS AND MEASURES USED IN PHARMACY. BY MR. BARNARD S. PROCTOR.

[*Abstract.*]

"The author first made a comparison of the apothecaries' weights of our own country with those of other civilized nations. Though there are forty different European pounds and as many ounces in general use, there were only two or three systems of pharmaceutical weights, and these not widely differing from each other. The English system, though good in the abstract, had no simple relation to the systems of other countries, nor to the other weights and measures of this country. Some of its own members were in an anomalous position. What was a fluid pound of apothecaries' weight? Was it 12 avoirdupois ounces, 12 troy ounces, or 16 avoirdupois ounces? A critical examination was then made of several suggested alterations in the weights and measures of pharmacy, those of Mr. Jacob Bell, Mr. Griffin, Dr. C. Wilson, and

Mr. Warington, being especially noticed. The advantages and disadvantages of the weights and measures authorized by the Medical Council in the new Pharmacopœia were next reviewed, and a suggestion made that the ounce of that system should be divided into drachms and scruples. To get rid of the fractions of a grain, which would otherwise be appended to these drachms and scruples, the author proposed that the value of the grain should be slightly increased; so that, instead of 18·229 grains being contained in one scruple, there should be only 18; instead of 54·687 in the drachm, there should be but 54; and 432 in the ounce, instead of, as now, 437·5. This was as near an approach to an amalgamation of the troy and apothecaries' system as he could devise. The elaborate and ambitious system proposed by the American Pharmaceutical Association was next noticed, and then the French metrical system, the merits and demerits of all under various circumstances being carefully weighed. For ultimate general adoption the author thought the American octonary system to be superior to the metric decimal system; that, in short, doubling and halving a number was better than multiplying or dividing by ten. He concluded by proposing the use of the American system, modified to meet the requirements and customs of the English."

A general discussion followed the reading of this able and elaborate Report.

(End of First Day's Meeting.)

SECOND SITTING.

Thursday, Sept. 15th, 9.30 A.M.

After the transaction of some general business, the following Papers were read:—

"ON THE APPLICATION OF MICROSCOPIC ANALYSIS TO PHARMACY.
BY HENRY DEANE, F.L.S., AND H. B. BRADY, F.L.S.
[*Abstract.*]

"After a general *résumé* of the various uses to which the microscope had been applied in connection with the various branches of science connected with medicine and pharmacy, the authors proceeded to detail certain processes employed by them, which they considered belonged rather to the domain of pharmacy than to that either of chemistry or materia medica. The investigations which they comprised under this head, were especially those which had reference to the condition in which the active matter of a drug exists in its preparations. The present paper, which it would be impossible to give a fair idea of without some, at least, of the large number of drawings that were used as illustrations, was especially devoted to the details of a series of investigations connected with the various preparations of opium. The authors did not wish the papers to be considered in any other light than as a preliminary investigation, and they propose to continue the subject for a future meeting of the conference."

Mr. STODDART commended to increased attention micro-chemical research. For five years he had constantly used the microscopic goniometer, which he then exhibited, in preference to employing chemical means for examining the alkaloids. He thought that the presence of gum in the solutions of opium would interfere more with the formation of crystals than would the resin.

Mr. DEANE said that opium must form an exception to Mr. Stoddart's statement, since he and Mr. Brady found that when the gum was removed, no crystals formed. He called attention especially to the much larger amount of codeia yielded by Patna than by Turkey opium, and thought that the possible therapeutic advantages of its substitution should be tested.

Dr. ATTFIELD thought the extension of this important inquiry might probably inform us in what condition the alkaloids exist in the opium.

Also, if the results from the same sample were found to be constant, a more ready means of valuation than any yet known would be gained.

Mr. SCHACHT urged the latter point also.

In reply, the authors emphatically repeated that they had made a large number of trials with each specimen, and had found constant results.

Battley's preparation seemed to give the most absolutely uniform product.

Mr. T. B. GROVES suggested that the reason of Patna opium having an excess of codeia might be due to its containing more of the poppy capsule, since this yielded much codeia.

In reply to Mr. Reynolds, who inquired if crystals of sulphate of lime had been detected, the authors said that they had not, but as only half an ounce of solution was used, it did not seem probable that much would be present. Distilled water ought alone to be used if the condition of the alkaloids was to be kept unchanged.

"ON THE PURITY OF SULPHATE OF QUININE OF COMMERCE.
BY MR. W. WALTER STODDART.
[*Abstract.*]

"The author's experiments showed that quinidine, and not cinchonine, must be generally sought for as the chief impurity in commercial sulphate of quinine. After pointing out the objections to the tests of Bouchardat and Pasteur, Stokes, Herapath, Brande and Pelletier, Mr. Stoddart proposed a modification of Liebig's, and gave the details of its application. A second trustworthy and ready test, for all possessing microscopes, was sulphocyanide of potassium. If a drop of a solution of the latter salt were added to a drop of saturated and neutral solution of the suspected quinine, and the mixture observed by the microscope crystals of sulphocyanide of quinidine and sulphocyanide of cinchonine, both of highly characteristic form and wholly distinct from the sulphocyanide of quinine formed at the same time, would be observed if either quinidine or cinchonine were present. For quantitative determination, the Reporter employed De Vry's iodide of potassium reaction, and detailed the results of his analyses of samples of sulphate of quinine from Messrs. Howards and Sons, De Lisle and Co. (Pelletiers), Mr. J. Hulle, Messrs. Herring and Co., and a German specimen. It was, he said, gratifying to be able to affirm that sulphate of quinine, if purchased in bottles or sealed packets, as sent out by the makers or obtained through well-known wholesale houses, is commercially pure and quite fit for medicinal use. It was the chemist's own fault if he were not supplied with an article of sufficient purity."

The PRESIDENT and Mr. BRADY claimed an excellent illustration of the good fruits of the Conference from this paper. In continuing their investigations upon microscopic analysis, they would gladly avail themselves of the method of precipitation as sulphocyanides which Mr. S. had brought forward, instead of confining themselves to evaporation only.

Dr. ATTFIELD said that the paper furnished had two important desirata, firstly, a qualitative test for alkaloids that was not in practical use before, and secondly, an improved method of employing a quantitative test.

Mr. D. HANBURY said that the Commissioners of the International Exhibition of 1862 analysed nearly every specimen of quinine exhibited, and found all to be practically pure. But it was obvious that specially prepared samples like these were no criterion of usual quality.

There was a practice amongst some foreign makers of sending for export to such countries as South America, a much less pure salt than they dare introduce upon the European market. An excess of moisture was the only impurity he had found in foreign quinine sold in England.

"ON COMMERCIAL PODOPHYLLIN. BY MR. JAMES SPEARING.
[*Abstract.*]

"After giving a short history of this drug, the author described the three processes usually followed in its preparation, and gave the results of an analytical examination of the product of each process. The method of the British Pharmacopœia was found to be the most economical and satisfactory of the three. He had examined twelve commercial specimens, and from the presence of alumina in five, inferred that they were prepared by the inefficient method of shaking the tincture with solution of alum; two contained iron, and one copper."

The PRESIDENT added that the author had sent him some podophyllin containing the mycelium of a peculiar fungus of a silvery-white colour. It was of large size, and readily seen amongst the dark-coloured powder. He was disposed to think that it was similar to the mould which attacked powdered coriander and chamomile.

If so, a similar destruction of the active principle must be feared when it attacked podophyllin.

Mr. T. B. Groves thought that instead of a process like that of the British Pharmacopœia, which gave a mixture of a salt of beberia and resin, it would have been preferable to have separated these principles.

"A CHEMIST'S HOLIDAY—JOTTINGS IN FRANCE. BY D. HANBURY, F.L.S.

[*Abstract.*]

"This was a short paper, written in a familiar style, entitled 'A Chemist's Holiday,' which consisted of memoranda on pharmaceutical subjects made during a visit to the Alps of Dauphiny. The author having visited the monastery of the Grande Chartreuse, took occasion to call attention to the important service which pharmaceutic art had rendered to the institution, the large revenues which, amounting to nearly £20,000 per annum, are at present chiefly derived from the sale of the elixir and cordials prepared by the monks. This was followed by some remarks upon the firs and pines of Dauphiny, and the various species of turpentine derivable from them; an observation on the frequency of mistletoe on the Scotch fir; and an enumeration of the more interesting medicinal plants noticed in this part of France. The author then reminded his hearers of a curious kind of sugar, called *Manna of Briançon*, which old authors have asserted is found upon the larches growing near that town, but which, from its rarity, has long fallen into oblivion. He remarked that the substance was nevertheless interesting, from the recent discovery of Berthelot that it contains a peculiar kind of sugar. The author stated that he had examined the larches about Briançon in the year 1857, but without finding a trace of saccharine exudation. On the present occasion, however, he was more fortunate, for he succeeded, by the help of some peasants, in obtaining a good specimen of the larch manna. The specimen which was exhibited consisted of a dry white substance, in small grains and tears, the largest of which scarcely exceeded in length one-third of an inch. The paper concluded with a few notes on the mineral productions of the country, and especially on the medicinal springs of Uriage."

The President remarked upon the paper as showing how much a knowledge of botany would add to the interest and pleasure of a journey.

"ON THE RANCIDITY OF FATS. BY T. B. GROVES, F.R.C.S.

[*Abstract.*]

"The author states the occasion of his paper to have been the observation of the preservative effect of aromatic oils on oxide of mercury ointment, which induced him to compare the relative efficacy of the various essential oils of commerce, both as regards mixed ointments and the pure fats.

"After general remarks on the process of rancidification, and the theories that have been imagined to account for it, he proceeded to consider the possibility of applying remedial measures of a radical character, which he decided in the negative. The experiments on variously-prepared specimens of lard, aromatized and non-aromatized, were then detailed, and the conclusion arrived at that creasote, oil of pimento, oil of cloves, and balsam of Peru, were capable of greatly retarding, if not of altogether preventing oxidation. A comparison of the effect of these aromata in preserving these aqueous solutions of albumen, gave countenance to the theory of the cause of rancidity of fats being the disturbance effected by a ferment of the albuminous order. He concluded, by strongly urging the necessity of using for the preparation of ointments, especially those containing metallic oxides, materials retaining unaltered the odorous principles with which nature has endowed them, and suggested the advisability of adding to lard, and other inodorous fats, small proportions of oil of pimento, to render them more permanent; to effect which, two drops to the ounce had been found sufficient."

The President expressed the opinion that in order to make lard keep well, the leaf or flare, from which it was rendered, should previously be thoroughly washed. It should be cut up and placed upon a sieve, which could be freely agitated in a vessel of water. The food of the animal would affect the quality of the fat, and good lard could not be expected from animals that were ill-fed.

Dr. Parkinson was reminded by the author's statement of the preservative power of balsam of Peru, that he (Dr. P.) had used the oil of benzoin for the same purpose with the greatest success.

Mr. Balkwill inquired the best way of keeping cod-liver oil from becoming rancid.

Mr. Robbins volunteered a reply to this question, detailing the results of some experiments which he made. Portions of cod-liver oil being exposed to the air, and closely sealed up respectively, the former became rapidly rancid, but the latter was as sweet after ten years as when first put up. That this change of rancidity was accompanied by absorption of oxygen, had been proved by Dr. Attfield.*

"ON THE PROCESSES FOR PREPARING SOME OF THE TINCTURES OF THE PHARMACOPŒIAS. BY MR. W. D. SAVAGE.

[*Abstract.*]

"The author had experimented upon twelve different tinctures, making four specimens of each, by four different processes. In all cases the four specimens were made from the same parcel of raw material, at the same temperature and with the same spirit. The first process was maceration for 21 days; the second, maceration for 7 days; the third, maceration for 48 hours, with subsequent percolation; the fourth, 21 days' maceration, with the addition then of percolation. The relative value of these processes was ascertained by evaporating a similar portion of each tincture over a sand-bath and weighing the residue. The whole of the results were given in a tabular form. The author considered that maceration with subsequent percolation yielded the best results, and that the period of maceration should, as a rule, be not less than 14 days."

Dr. Attfield said that if it were in our power to determine the quantity of active principle in a tincture, this would be the line of search which we should follow. Under the inability to do this, the next best thing was to find when the solvent ceased any longer to extract the drug. Following this plan, the late Dr. Burton took the specific gravities of tinctures after macerations for different periods of time, and thus fixed how long a contact was needful in each case. The author of this paper had adopted evaporation, drying and weighing, to attain the same result. The use of a sand-bath was open to objection as not being an equable source of heat, even in several experiments that might be conducted simultaneously; an oil-bath should be used, and the extractive should, of course, be dried until it loses nothing upon repeated weighing. Similar experiments upon other tinctures were much needed.

Mr. Schacht objected to the assumption that extractive was any guide to the quality of a tincture. Could any one suppose that tincture of orange-peel was better because containing much extractive? He would instance an infusion of tea, the best being made by the free use of the leaf and very short digestion, and not by continuing it until much extractive was taken up.

Mr. Robbins would like to know more as to the frequency with which the author had agitated the tinctures during maceration. Mr. Hills had shown that so short a period as forty-eight hours would suffice, provided that agitation were correspondingly frequent.

Dr. Edwards explained the highly ingenious process for combining maceration with both percolation and expression, which was lately introduced by Dr. Redwood.

Mr. Balkwill thought that the moral to be drawn from this paper was, that we should adopt a uniform practice in the maceration of tinctures, or great variation in the product would result.

"ON THE CULTIVATION OF MEDICINAL PLANTS AT MITCHAM. BY MR. J. T. P. B. WARREN.

[*Abstract.*]

"The author gave a list of the plants cultivated and the acreage they occupied. The yield of oil per acre varied with season and soil; lavender yielded 10 to 20 lb. per acre, the second year's growth giving more than the first or third; peppermint, 8 to 12 lb., though much influenced by soil; 4 cwt. of chamomiles were obtained from an acre, and gave 8 lb. of oil; and pennyroyal afforded about 12 lb. of oil per acre. Mitcham produces annually 30,000 to 40,000 bushels of roses and about 11 tons of

* Pharm. Journ., 2nd ser. vol. ii. p. 116.

chamomile flowers. The details of extraction of essential oils were then given and some remarks made on the rotation of medico-agricultural crops."

Mr. D. Hanbury said it was well known that the volatile oil of chamomile flowers had a sky-blue colour when freshly drawn, gradually acquiring a sherry colour in a few months. Some oil, said to be freshly made, had been shown him which had a sherry colour already. Did not this suggest that the growers distilled the whole plant in some cases? He knew that the plant was rooted up and sent to market for making extract instead of the flowers.

"ON THE PREPARATION OF SMALL QUANTITIES OF CONCENTRATED INFUSIONS. BY MR. T. GRUNDY.

[*Abstract.*]

"The finely comminuted materials are infused in the requisite quantity of boiling water, and the mixture then percolated in a little jacketed tin percolator, kept hot by a current of steam from a small tin boiler. The first portion of the product is set aside, and the second and third reduced in bulk by evaporation. The three are then mixed, and spirit added, in the proportion of three to seventeen. Two or three of the infusions require special preparation; linseed cannot be so treated, and infusions requiring temperatures between those of cold and boiling water require the aid of a thermometer."

The President took the opportunity of offering a word of advice to those dispensers of medicine who had not a frequent demand for infusions. Let them not be tempted to make the substitution by the convenience of the concentrated preparations, for the patient could nearly always distinguish the difference, and there was no cause which so frequently led to comparisons, to the disadvantage of the person using these preparations for dispensing.

"ON POTENTILLA TORMENTILLA. BY MR. JOHN ADAMS, LOUGHBOROUGH.

[*Abstract.*]

"The author gave a short history of the plant, and drew attention to its peculiar value as a *non*-stimulating astringent and febrifuge. In the event of its being again introduced into the Pharmacopœia, he proposed formulæ for a tincture and infusion, and exhibited a specimen of the former to the meeting."

Dr. Parkinson remarked that the roots were in favour as an astringent remedy for cattle in the north of England.

(*End of Second Day's Meeting.*)

THIRD SITTING.

Friday, September 16th, 9.30, A.M.

REPORT OF THE COMMITTEE APPOINTED BY THE CONFERENCE TO CONSIDER THE SUBJECT OF THE PREVENTION OF ACCIDENTAL POISONING.

The prevention of accidental poisoning, or of accident in any shape, connected with the very responsible duties of a chemist, cannot fail of itself to be a matter of the deepest interest, and we do not wonder that the subject should have engaged the thoughtful attention of so many of our brethren throughout the kingdom.

Hitherto, no satisfactory conclusions appear to have been arrived at, but the investigations of your Committee show that the subject is worthy the consideration of every one who values human life, and would desire to put an end to the recurrence of those sad domestic tragedies from "accidental poisoning."

On the present interesting occasion, when so many of our brethren are assembled to meet and welcome to our city the noble and scientific institution, the British Association, we think there cannot be a more befitting moment to discuss the grave and all-important matter which is this morning to engage our attention.

From the wide range of subjects that come within our notice, and the mental and moral diversities of character with which we have to deal, we cannot expect uniformity of action, yet we would fain hope that from the long and continuous attention we have devoted to this matter, that some plans and suggestions made through your Committee may be found available to prevent the catastrophes of which we so often hear.

Your Committee have thought it well that their deductions and remarks should be based upon facts; they have therefore, as briefly as possible, drawn out the leading circumstances of all the cases of accidental poisoning recorded in the 'Pharmaceutical Journal' for the last two years, viz. from July, 1862, to June, 1864, inclusive. They are twenty-five in number, and occur in the following order :—

No. 1.—A tradesman being ill sent for his medical adviser, and received from him two bottles, one containing embrocation for external application, the other a draught to be taken internally. On the following morning the embrocation was given, under the erroneous impression that it was the draught.

On examination, the housekeeper said *no* label was on the embrocation, neither did any one apprise her it was poison. The medical man acknowledged that the bottle was not labelled "poison," but submitted that it bore a label intimating that it was for external use only.

No. 2. *Accidental Poisoning by Arsenic.*—In this case it is recorded that Mrs. C——, after assisting her son in the preparation of a sheep-dipping composition of arsenic and soap, made a pudding for the dinner of her family and servants, and that by some means not ascertained, some of the arsenic became mixed with the pudding. One man died; the rest of those who partook of the pudding recovered.

No. 3. *Accidental Poisoning by Sulphate of Zinc.*—A man, aged 52, took by mistake a wineglassful of a concentrated solution of sulphate of zinc, recommended to him by a veterinary surgeon for a lotion for a horse. Result fatal.

No. 4. *Accidental Poisoning by Oxalic Acid.*—A man, aged 58, died from the effects of oxalic acid taken in mistake for Epsom salts. The wife of the deceased went to a chemist's shop for some salts and senna. On opening the packets she found both to be apparently the same; she took them back, but found the shop closed. On her return she dissolved the smaller packet of crystals in water, and handed the solution to her husband, who drank it, and died in consequence.

The packet was boldly labelled "Oxalic Acid, Poison," but it appeared the woman could not read.

No. 5. In this case, a solution of strychnia appears to have been dispensed by a surgeon or his assistant, in mistake for solution of emetic tartar. The bottles containing the two solutions were standing at no great distance from each other, but were unlike in almost every respect, except that they were both labelled "Poison," and both contained colourless fluids. All the ordinary precautions to prevent accident had been taken.

No. 6. *Accidental Poisoning by Extract of Aconite.*—This was a clear case of error in dispensing by a chemist's assistant; extract of aconite was put into pills in mistake for extract of wormwood, with a fatal result.

No. 7. In this instance, a druggist sold croton oil for syrup of squills, with a fatal result. No particulars given.

No. 8. A father gave to his child, two years of age, a teaspoonful of camphorated oil, in mistake for a mixture, "without looking at the label." The child died.

No. 9. In this instance a wife administered to her husband oxalic acid in mistake for Epsom salts. Result fatal.

No. 10. This is an instance of tartar emetic being sold for cream of tartar, by a wholesale house. Several persons were made ill by it, but no fatal case occurred.

No. 11. A boy, nine years of age, obtained access to a bottle of almond flavour, sold by a druggist to his mother for confectionery; the boy took, as he said, "just a taste," and died the following morning. The bottle was not labelled "Poison," nor was the woman even told it was poison.

No. 12. In this case cream of tartar mixed with arsenic was sold to several persons by a druggist, but no fatal case occurred.

No. 13. This is a sad case of laudanum being sold by a druggist in mistake for black draught. The victim was a lady twenty-eight years of age, a healthy woman. Her maid procured for her from a druggist a pill and draught. It appeared that the druggist's shop was being papered and painted, and was in a confused state; through this circumstance the draught phial was filled with laudanum in mistake, by the druggist himself.

No. 14. This was an instance of Burnett's fluid, administered by mistake for fluid magnesia, with a fatal result.

No 15. A second fatal case from the same cause.

No. 16. A solution of morphia was sent to a lady, for her own use, with directions how to take it, but it was not labelled "Poison." The nurse carelessly administered a portion to the infant, in mistake for dill water, with a fatal result.

No. 17 is a case of accidental poisoning by chloroformic anodyne. The record simply states that the patient had given to her by mistake six drachms of the anodyne. The result was fatal.

No. 18 is a case of laudanum being sold by a druggist himself in mistake for tincture of rhubarb, with a fatal result.

No. 19 is a second case of the same, also with a fatal result. No attempt to account for, or excuse the carelessness.

No. 20. This is an instance of a man being poisoned fatally by taking saltpetre instead of Epsom salts, sold to him by a druggist in mistake.

No. 21. This is the third recorded case in two years, in which laudanum has been sold by a druggist in mistake for tincture of rhubarb, with a fatal result.

No. 22. In this case two lads, aged fourteen and sixteen, were fatally poisoned by sheep-dipping powder containing arsenic. It was folded in brown paper, not labelled, and was mistaken for sulphur.

No. 23. This case demonstrates the necessity of a legal restriction to prevent unqualified persons from dealing in poisons. A grocer's wife, in the absence of her husband, supplied an applicant with five grains of strychnia, in mistake for calomel. The poor victim, a young woman twenty-seven years of age, expired in great agony in less than fifteen minutes after taking it.

No. 24. In the same month we have recorded a second case of poisoning by strychnia, and as if to teach us humility, in this instance the mistake was made by a well-educated and experienced chemist's assistant in an old and well-regulated establishment. One witness said, he considered the arrangements of the establishment to be exceedingly good, and he knew that elaborate pains were taken to have the prescriptions checked; but it was proved that the strychnia had been kept in a state of powder for the convenience of dispensing, and not in its crystalline form; and that the bottle containing the powdered strychnia was kept on the same shelf as the James's Powder, for which it had been mistaken, and was separated from it by only one bottle. The strychnia bottle was labelled "Poison." The jury have since pronounced the assistant "not guilty," when tried for manslaughter.

No. 25. In our last case, a surgeon's assistant was making solution of morphia; he turned it into a measure, from which he began to filter it into a bottle; he retired from the surgery for a few minutes, during which time the surgeon came in, made up a mixture, and thinking it water in the measure, used it as such, with a fatal result.

Such are the simple facts of the twenty-five cases before us, and it would not be difficult to engage your attention for some time, in commenting upon them; but we doubt not you have felt as we have upon each case as it was brought before you, and are disposed rather to gather from them the lessons of wisdom and charity they are designed to teach, than to indulge in harsh criticism upon those who have already suffered so severely from the consequences of their error.

Your Committee, however, think it will only be doing our brethren justice to show that less than half of these cases can be laid at the doors of a legitimate chemist and druggist, by classifying them as follows:—

There are 10 cases in which the mistake was committed by the administrator;
2 cases by a surgeon;
1 by a wholesale house;
1 by a grocer's wife;
11 by retail chemists or their assistants.

Your Committee have had correspondence with various chemists of standing in several parts of the kingdom, and it is now their pleasing duty to mention the various suggestions that have been brought under their notice. They are classed under the three heads of Shop Arrangements, Dispensing, Sale of Poisons.

SHOP ARRANGEMENTS.

It has been suggested by one friend that all poisons should be kept in a separate room.

By several others, that they should be kept in a poison-cupboard, having a lock and key.

By another, that poisonous liquids in the shop and dispensing department should be kept in opaque white glass bottles, as a contrast to the dark-coloured tinctures on our shelves.

By another, that all poisons, liquids or solids, should be kept in bottles registered by our fellow-citizen Mr. Merrikin, and called "Merrikin's caution bottle." They are covered with pointed excrescences (except where labelled), reminding by the sense of touch that poison is being dealt with.

Again, it has been suggested that on every bottle containing poison in our shops or dispensing departments, the maximum dose of the contents should be distinctly marked on the bottle.

Another, that shop bottles containing poison should be labelled in Old English, in contrast to the Roman character in common use.

Another, that the labels on bottles containing poison in our shops or dispensing departments should be so placed or shaped that the whole of the label can be seen at a glance, instead of curling round the bottle in the usual way.

One more suggestion has been made under this head, as an amendment to the last, viz. that *all* shop or store bottles should be labelled in the way last described, but having the name of the base of the preparation at the top, and in larger type than the portion describing the nature of the preparation, which should be placed under it, as in the specimen on the table.

We have next to give you the various suggestions that have been made, coming under the head of—

DISPENSING.

In this department your Committee feel there is cause for the most anxious deliberation. They gladly acknowledge the great care and attention bestowed by their brethren generally upon the arrangements of the dispensing department, and feel that they have little of a novel character to bring before them; but it is their duty to present the following suggestions,—premising first, that in all instances a distinct department should be set aside for dispensing, and as far as practicable it should be such as will exclude senseless gossips or others who may cause to the dispenser abstraction of mind.

Under the head of "Dispensing" we have the following suggestions. The principles of some of them are, no doubt, generally adopted.

It has been suggested that wherever practicable it should be an invariable rule, that every prescription be checked by a second person before it is sent out, and that the weighing or measuring dangerous poisons be witnessed by him.

Also that liniments, lotions, and poisonous preparations of all kinds, should invariably be dispensed in bottles of a peculiar shape or construction. The following have been mentioned as suitable.

Bottles similar in shape to soda-water bottles, that will not stand.

That mixtures be dispensed in ovals, and poisonous liquids in perfect squares.

That all medicines for external application be dispensed in blue bottles with yellow labels for directions and red printed "Poison" labels.

That labels on bottles of medicine to be taken internally be printed in black, but for external use in *red* ink.

That all poisonous liquids be dispensed in Savory's well-known poison bottles with narrow necks, so that only drops or a very small stream will issue at a time, intending to remind the dispenser or administrator that he is dealing with something strong.

Then we have the York Glass Company's ingenious modification of Savory's bottle, and Gilbertson's wedge-shaped poison bottle, that will not stand on end.

Also Bird's poison corks, attached to a star-shaped wooden head or cap, the sense of touch being thus appealed to.

Then we have Thonger's rough labels, with the same intent, and Thompson's capped bottles with a lock and key.

One eminent firm has adopted the plan of keeping all dangerous things, as Tinct. Opii, Liquor Morphiæ, Morphine, Strychnine, etc., in tin cases, without covers, as tall as the tops of the stoppers, and so large that the bottles must be taken out to be used.

There is also on the table a specimen of a metal band for poison bottles, invented by Mr. Batchelor, of Fareham.

Lastly, Merrikin's caution bottle, for dispensing, similar in its principle to his caution bottle for the shop, but differing in form, the principle of both being that of appealing to the sense of touch, and being permanent, effective, and unmistakable, which cannot be said of others.

Our third division of suggestions comes under the head of—

SALE OF POISONS.

It has been suggested on this subject that certain peculiarly dangerous poisons, such as Strychnia, Morphia, Prussic Acid, etc., should not be sold in an unmixed state without a medical order, under any circumstances whatever.

That poisons such as Laudanum, Oxalic Acid, and others in common use, should as far as practicable be sold only to persons of mature age, and personally known to the vender.

That no poison be sold in dangerous quantity by any assistant or apprentice without the express sanction of the principal.

That dry poisons, such as Oxalic Acid, Sugar of Lead, Red and White Precipitates, etc. etc., be invariably folded in black paper, having the usual label with the name of the article, and in addition a label with the word "Poison" in bold white letters on a black ground carefully attached.

This concludes the suggestions which have been made to your Committee. Many of them meet with their most cordial approval, and will be recommended by them as worthy of universal adoption.

Your Committee have now to lay before you the practical deductions which they have drawn from the consideration of the facts and suggestions brought under their notice.

The first is, that there are seventeen of the twenty-five cases of accidental poisoning, in which there is every reason to believe that a thoroughly effective poison-bottle would have prevented the accident.

Next, that there are at least *three* cases in which, had the poison sold been wrapped in paper of distinctive character, and labelled as suggested, there is reason to believe that the accident would NOT have occurred.

Thus we have the encouraging assurance that at least 80 PER CENT. of the usual cases of accidental poisoning may hereafter be prevented, by the use of such means.

Your Committee therefore beg to express their obligation to those brethren who have assisted them by their counsel and suggestions, which if not very numerous have been very practical, and have enabled your Committee to hope that their labours will not have been in vain. They trust that the following recommendations will meet with the approval of all who are in earnest in seeking to avoid the terrible consequences of error in their most responsible duties.

Your Committee are happy to be able to observe, that only one of the twenty-five cases of accidental poisoning occurred apparently through *ignorance*, and that in a case calling loudly for legislative interference to restrict the sale of poisons to educated persons; but although this case was not that of a chemist or his assistant, we dare not assume that *only grocers' wives* need to be more highly educated than they are. Your Committee therefore beg respectfully to commend to every one engaged in the practice of pharmacy, the present facilities for acquiring a good theoretical as well as practical knowledge of their business, feeling assured that such knowledge is the best foundation for future safety and usefulness in their calling.

They next remind their brethren that they consider it indispensable to safety, that a separate and suitable part of their shop or premises should be set apart for dispensing prescriptions, wherever this has not already been done.

Also, that in the dispensing department or other suitable place, there be a *repertorium toxicorum*, or *poison cupboard*, under lock and key, in which should be kept all the concentrated and virulent poisons, or a small bottle of each sufficient for present use, the bottles being filled from store bottles in another and larger store cupboard or room, as required.

They also recommend, that the labels upon all shop and store bottles be in future so placed or shaped that the whole of the label can be seen at a glance, instead of curling round the bottles in the usual way; and

That the new series of Latin labels introduced by Messrs. Ford and Shapland be taken as examples of the plan of labelling shop bottles recommended by your Committee.

Your Committee approve the suggestion that, wherever practicable, every prescription be checked by a second person before it is sent out.

They also strongly recommend that liniments, lotions, and poisonous preparations of all kinds, be invariably dispensed in the caution bottles before adverted to, and with labels printed in red ink.

In the retailing of poisons, your Committee recommend very cordially the suggestion that the more concentrated and potent poisons, such as strychnia, morphia, prussic acid, etc., should not be sold in an unmixed state, without a medical order, under any circumstances whatever.

Also, that no poison be sold in a dangerous quantity by any assistant or apprentice, without the express sanction of the principal.

Again, that every specially dangerous substance, in addition to its name, be distinctly labelled "Poison," in white letters on a black ground, before it is sent out, excepting medicines dispensed from a prescription where the dose or use of it may be considered sufficient.

Lastly, your Committee strongly recommend that dry poisons, such as oxalic acid, sugar of lead, red and white precipitate, etc., be invariably folded in paper of a distinctive character; and, in addition to the name of the article, that a label with the word "Poison," in bold white letters on a black ground, be carefully attached to each packet.

Your Committee, however, cannot conclude their report without expressing their firm conviction, that no amount of ingenious contrivance, or of education, will avail to prevent repetitions of the sad occurrences that have been brought before us, without the cultivation of a steady, thoughtful, anxious yet composed mind, bent on business when in business, and alive to the dangers and responsibilities incident to the retailing and dispensing of medicines.

Your Committee have devoted much and earnest deliberation to the subject entrusted to them; they have endeavoured to trace the principal causes of accident, and they are bound to confess that in many instances they can only ascribe them to gross and culpable neglect.

They therefore beg to urge upon their brethren the necessity on their part of a careful surveillance by responsible parties; a thorough revision of their mode of conducting business, in all its details; and the discouragement of long and late hours of business, so detrimental to the energies of mind and body of their assistants and apprentices; for, however conscientious they may be in the discharge of duty, we must remember that they lack the wholesome stimulus to continuous exertion which we enjoy in a consciousness of proprietorship.

The successful management of a business so nearly allied to a profession must place a man in a position higher than the mere retailer of goods, for it demands a higher cultivation of the mind, and is therefore deserving of a higher rate of remuneration; and this will be gained in the respect and confidence of his customers, who are often pleased to treat their chemist as a confidential friend.

Let it, then, be our ambition to aim at perfection *in* our legitimate business; there is in it abundant scope for the exercise of all our powers, and without this we shall never rightly fulfil our duties, or meet the requirements of an exacting and discerning public.

Your Committee have yet to perform a simple act of justice, by tendering their acknowledgments to our esteemed secretary, Mr. Pooley, for his assistance and encouragement in completing a report, which they trust will not be without some practical results.

(Signed) J. Raymond King.
J. H. Marsh.
F. W. Kent.
John B. Merrikin.

The President read extracts bearing upon this question from the Sixth Report of the Medical Officer of the Privy Council just published, including the Report by Dr. Alfred S. Taylor, F.R.S., "On Dangers arising to the Public Health in the conditions under which Drugs and Poisons are retailed." In giving the conclusions which Dr. Taylor records, the President took the opportunity of assuring the Conference that the Council of the Pharmaceutical Society would not support or approve of exclusive privileges being conferred upon Pharmaceutical Chemists to the exclusion of other competent dealers in drugs.

It was clear that poisonous medicines must be sold in villages where no person devoting his whole time to pharmacy could make a livelihood, but a case had been made out for enforcing some restrictions.

It had occurred to him that the village huckster might be allowed to sell some of the potent remedies if they were put up in packets or bottles by recognized wholesale houses, whose names they should bear. The question as to what drugs should be considered poisons had often been canvassed, and though well aware of its difficulties, he must say that it was quite feasible to form a schedule of those which had most frequently led to accident.

He approved of the proposed system of inspection of medicines by a second person, also of the separation of the more poisonous drugs, and of the dispensing department being distinct from the retail. At the same time, it was clear that these arrangements must be subject to circumstances.

He thought highly of the plan of tying over the stoppers of powerful drugs, and had adopted it for years.

Mr. Merrikin's rough shop bottles appeared to him to be admirable, as were also the poison labels with white letters on a black ground.

He was aware that it was sometimes the practice to dilute such remedies as syrup of poppies for retail sale, in order to diminish the risk of accident. This was, on the other hand, a dangerous proceeding, as likely to cause accident when the proper article was supplied. In conclusion, the President deprecated late hours of business, and expressed a warm sympathy in the interest of assistants and apprentices.

Mr. Pooley remarked, that the recommendations of the Committee were not intended to apply inflexibly to all cases, since their adoption must be modified by varying conditions.

Mr. Tylee expressed approval of the plan of having peculiar-shaped bottles for potent remedies upon the shelves, and considered that the public liked it as evidencing special care.

Mr. Abraham begged to take that opportunity of conveying his gratitude to his professional brethren for the many expressions of sympathy which he and his partner had received since a late painful occurrence. He would further take the opportunity of explaining some points which had been misunderstood, because the course of the legal proceedings had not afforded this, and the line of defence adopted by Mr. Poole's counsel (though not by his wish) was to exaggerate the blame attaching to his principals.

The facts were that fourteen dark-blue bottles were kept together in the dispensing department, strychnia being the one most frequently used, the others having P. Digitalis, P. Conii, P. Salinæ, Hydr. Iodid., etc. Upon the strychnia was a very conspicuous label, "Poison."

The practice of the establishment had been to keep this drug in crystals, but an order for an ounce of the powder had induced an assistant to pulverize it, but he (Mr. A.) knew nothing of this until after the accident. When the trial approached, his firm were prepared with a large amount of evidence as to the precautions adopted by various leading houses, which however varied widely. They were advised by counsel that, even if proving their arrangements to have been the best that could be devised, that would be no defence, and the amount of the damages would be the only question. Under those circumstances, his firm felt that an arrangement was desirable, being anxious to make what reparation they could for their part in such a melancholy occurrence.

Mr. Abraham would conclude these personal allusions by referring to a subscription towards reimbursing the firm, which had been suggested, and even commenced. On behalf of Mr. Clay and himself, he must respectfully decline receiving this.

With regard to the suggestions of the Committee, he was a strong advocate for removing the dispensing department to a part of the shop where customers could not distract the attention of the dispenser by conversation. The plan of checking all compounded medicines by a senior assistant was very important, and their method was for this person to receive the prescription from the customer, see to its being copied, place it and the necessary written label or labels in an envelope, and hand over to the dispenser. This plan answered well, and in his large experience he had never known a wrong label affixed, as it was ready written before the bottle, etc., was filled. The bottle was corked, but not tied over, and returned to the senior assistant to examine and wrap up.

As a substitute for a "poison cupboard" under some circumstances, he had put a bar across a shelf of perhaps twenty bottles, and secured it by a lock.

For liniments, he used the green "actinic" round phials made by the York Glass Company, with a distinct rough label bearing the word "Poison."

He (Mr. A.) trusted that the Conference would state clearly what precautions should be adopted, so that, in the event of any accident, those chemists who had employed them might be exonerated from the charge of carelessness.

Mr. Balkwill considered that the carelessness of chemists had been grossly exaggerated, and that the proportion of accidents occurring from poisons was small as compared with other causes of violent death. All knew how frequently medical men made serious blunders in writing prescriptions, the consequences of which were averted by the vigilance of the dispensing chemist. When, however, unqualified dispensers, as errand boys, etc., were employed by general practitioners, we could not doubt that the same errors in prescribing occurred, but that they were not rendered harmless as in our own case. He approved of most of the suggestions of the Committee.

Mr. Schacht commended the system of checking, and had long adopted it. It was not only to prevent serious accident that it was important, but as an efficient remedy against those vexatious but trifling errors which altered the sensible quality of a medicine and destroyed the confidence of the patient. He could not avoid expressing his regret that Messrs. Clay and Abraham should have compromised the late action against them, instead of defending it, and at the same time the rights of the trade, before a jury.

The suggestions of the Committee were then considered *seriatim*. In a discussion upon a separate dispensing department,—

Mr. T. B. Groves objected that, being out of sight, it would be allowed to be untidy, and Mr. Leay feared that it would often be dark, if far from the window.

Mr. Pooley denied that there were any sufficient reasons why such a place should be untidy.

Mr. Daniel Bell Hanbury said that some establishments were so situated that the addition of a dispensing department was not practicable, which was the case in that with which he was connected.

The President related the experience of another leading house in London, where the experiment of putting up a screen was tried more than thirty years since, but the old plan of using the counter indiscriminately for dispensing and retail had been returned to.

Other members quoted the practice of Apothecaries' Hall and leading dispensing houses in favour of the separate system.

Mr. D. Hanbury spoke in favour of a "poison cupboard," which was an arrangement existing at Plough Court, with the additional precaution that some of the more potent drugs were not allowed to be taken out without a witness.

Mr. Merrikin called especial attention to the suggestion for the whole of the label being visible upon the front of the shop bottle. The Committee had been influenced by the knowledge of a case where Liq. Ammoniæ was dispensed instead of Liq. Ammon. Acet., and death resulted.

Mr. Wade suggested that a useful precaution consisted in placing the ordinary-shaped label in a perpendicular position; thus, Vin. Colchici might be so labelled when standing, as it too frequently did, between Vin. Antimonialis and Vin. Ipecacuanhæ.

Mr. Pooley expressed approval of a label introduced by Messrs. Ford and Shapland, in which the name of the drug, as "RHEUM," was given in large letters, and the preparation, as "Tinct." or "Syrup," was placed beneath it. Abbreviations were a fertile source of error, and they were avoided very much by this plan.

Mr. T. B. Groves suggested that the label might be repeated, so that the essential name would be seen from either side; thus—Tr. Opii;

Opii Tr.

Some members said that this appeared likely to create error.

Mr. Merrikin queried whether the shop bottles used in compounding a prescription might not be left upon the counter until it was finished, and then be reviewed by the dispenser.

The general expression was, however, opposed to this plan.

The President called attention to the importance that the contents of shop bottles should be checked before they were used. In his establishment, a junior assistant filled the bottles that required it each morning, entered them in a book, and this entry was signed by a senior assistant after having examined the correctness of the filling.

Mr. D. B. Hanbury and Mr. Abraham spoke to using a somewhat similar system.

In the discussion upon bottles and labels, Mr. Matthews urged that any special bottle would be liable to be put to other purposes, especially amongst the poor, and hence the value of the precaution would be lost.

Mr. T. B. Groves would go still further in his objections, and say, that some of these precautions were mischievous, especially those which appealed to the sense of touch, instead of requiring that a patient should use more caution in other respects.

In reply to this, it was shown that nearly every establishment adopted some precaution or other in dispensing medicines for external use, but what was wanted was some uniformity of practice in this respect.

Mr. Schacht was anxious to avoid any method which would compel a duplicate set of bottles being kept for liniments, etc. He had been in the habit of covering an ordinary bottle with blue paper when dispensing preparations for external use.

Mr. Reynolds thought that a slight modification of Mr. Schacht's plan would meet most of the difficulties of the case; thus, a ribbon of rough and coloured paper placed spirally round a bottle of any shape would answer the same purpose, and, he thought, present many advantages. It would permit the appearance and quantity of the contents to be seen, would catch the eye in any position, and appeal to the sense of touch equally, whilst it could be applied to any bottle, and be removed easily if required. It might be applied in a moment.

The President, Mr. Abraham, Mr. Merrikin, Mr. Wade, and others, approved of paper round the bottle as a safeguard.

Mr. Robbins thought that a label printed in red ink upon the York Glass Company's special bottle, was a good protection against mistake.

The President recommended the meeting to bear in mind the reason given by the late Jacob Bell to Lord Wensleydale for objecting to some of the Poison Bills that had been introduced, viz. that "we did not wish to have a weak fence round a pond that was dangerous."

The result of the discussion of the Report was, that the meeting agreed to a series of suggestions which were ordered to be printed, and a copy placed in the hands of every member before the next sitting.

A communication was read from Mr. W. J. Halliday, of Manchester, in relation to prosecutions directed against chemists for the consequences of errors made by them or their assistants, and suggesting that a fund should be established, under suitable management, to defray the expenses of such legal actions.

The whole of the opinions expressed in the meeting were to the effect that the objections to taking such a course were an insuperable obstacle, and that it could not be adopted.

(*End of Third Day's Meeting.*)

FOURTH SITTING.

Monday, September 19th, 9·30 A.M.

The following suggestions, arising out of the discussion on the Accidental Poisoning Report, were submitted to and accepted by the meeting:—

"SUGGESTIONS CONCERNING ACCIDENTAL POISONING.

"The Members of the British Pharmaceutical Conference have had under deliberation the subject of the prevention of accidental poisoning. The result has been to convince them that most qualified dispensers of medicine already adopt precautions to this end, and they consider that the comparative rareness of mistakes shows that such safeguards are generally attended with success. It being desirable however that some approach to uniformity of practice should exist, the following suggestions are offered:—

"1. It is recommended that all who are, or expect to be, engaged in the practice of pharmacy, should take advantage of existing facilities for acquiring a good theoretical as well as practical knowledge of their business, as being the best foundation that can be laid for future safety, as well as usefulness, in their calling.

"2. It is desirable that, where practicable, a separate and suitable part of the shop of a chemist and druggist should be set apart for the dispensing of prescriptions.

"3. In the dispensing department, or other suitable place, there should be a *repertorium toxicorum*, or 'poison cupboard,' under lock and key, in which should be kept all the concentrated and virulent poisons. An additional protection of similar character consists in securing the stopper of a bottle by tying over or other means.

"4. It is advantageous that labels on shop bottles should be visible at a glance; the words being, for instance, in two short lines, on a square label, rather than in one line on a long curved label.

"5. Where practicable, every prescription should be checked by a second person before it leaves the shop.

"6. It is expedient that liniments, lotions, and poisonous preparations for external use, should be sent out in such a form as to be easily distinguished, by touch as well as sight, from medicines intended for internal administration.

"7. Every specially dangerous substance sold by the chemist and druggist, should, in addition to its name, be distinctly labelled 'Poison;' except in the case of medicines dispensed from a prescription, where the statement of the use or dose may be considered to be sufficient precaution. A label having the word 'Poison' in white letters on a black ground is well adapted for the above purpose."

Dr. ATTFIELD, in rising to move the reception of the Report, alluded to the care with which facts had been collated, the practical value of the conclusions, the explicit manner in which it had been drawn up, and the important series of suggestions it had elicited. He proposed "That the Report of the Committee appointed by the Conference to consider the means best calculated to prevent the recurrence of accidental poisoning be received, and that the best thanks of the meeting be accorded to the reporters, Messrs. King, Marsh, Kent, and Merrikin."

Mr. MATTHEWS seconded the resolution. It was carried unanimously.

"ON THE CALABAR BEAN. BY J. EDWARDS, PH.D., F.C.S.

[*Abstract.*]

"The author illustrated the chemical reactions of this poisonous substance, and showed an alcoholic extract which, he said, contained two distinct active principles, both soluble in ether, and both miscible with, but not clearly dissolved by chloroform. He also exhibited Dr. Frazer's tincture of Calabar Bean, made by percolation of two ounces of the white kernel with two fluid ounces of rectified spirit. The dose of this tincture is five minims, equal to three grains of the bean, and may be increased to fifteen minims. Dr. Edwards then showed a watery emulsion of the extract, and performed reactions with reagents similar to those used in testing for strychnia. The general facts relating to the bean had been already published in a paper and report contained in the 'Pharmaceutical Journal' for September."

"THE MORPHIA SALTS OF COMMERCE. BY MR. W. E. HEATHFIELD.

[*Abstract.*]

"The inquiries of the author had been directed to the amount of moisture existing in these salts, and also to the question as to whether codeia was present in them.

"Three samples of hydrochlorate from different manufacturers had been examined, and found to contain respectively 5·8 and 9·8 per cent. of water, estimated by drying at 212°. The amount of alkaloid obtained from each of the above (dried at 212°) was 79·7, 76·7, and 74·3,—the quantities thus varying inversely as the amount of water.

"It was noticed that the samples containing the most moisture dissolved more readily in water, and their solution was less coloured than those which were originally drier.

"Three samples of acetate were then examined in a similar way, and found to contain respectively 5, 10, and 12·6 per cent. of moisture. It was found that the sample containing least water fused, and became dark-coloured, with loss of structure on application of a water-bath heat; while that containing the most water retained its pulverulent form unaltered at that temperature.

"The morphia precipitated from these samples was found to be remarkably pure, being perfectly soluble in caustic potash; scarcely acted on by ether, and almost entirely free from codeia, as were also the mother-liquors from which they were separated.

"The author also quoted experiments by Mr. How to show that, however feasible the conversion of morphia into codeia might appear on a comparison of their formulæ, it could not be carried out; a substance isomeric with codeia had been obtained, but it was by no means identical."

Mr. T. B. Groves alluded to the instance of patients in whom codeia produced intolerable irritation and itching, even when the amount was only small and existed as a contamination of a morphia salt. The demand for codeia now and its high price induced the maker to separate it, and there was now none present in morphia salts as used to be the case.

Mr. Heathfield said that one manufacturer who had saved his morphia residues for the past fifteen years, had now extracted some hundreds of ounces of codeia from them.

"ON COMMERCIAL PHOSPHORIC ACID. BY R. PARKINSON, PH.D.

[*Abstract.*]

"Twenty-eight samples had been examined with reference to their strength and freedom from impurity, the result as to strength being that three samples came up to the British Pharmacopœia strength; five more were about the London Pharmacopœia strength; while the remainder were of various shades of declension. Phosphate of ammonia was present in six samples, sulphuric acid in one, nitric acid only traces in any. The presence of ammonia was considered evidence that the samples containing it had been made from the glacial acid, which commercially is made by heating the phosphate of ammonia, the whole of the ammonia never being practically got rid of. One sample of German glacial contained 5 per cent. of ammonia, which is equal to 17½ per cent. of tribasic phosphate of ammonia. If a pure glacial acid could be readily obtained commercially, that was suggested as the best and safest means of obtaining the dilute acid; and the combustion of phosphorus, with arrangements for the supply of air and collection of acid, was suggested as the best mode of obtaining such a pure glacial acid. Other plans for its preparation, which were detailed, had been tried, and found unsatisfactory."

Mr. T. B. Groves alluded to a suggestion which he had made some years since for the use of amorphous phosphorus instead of the ordinary variety. He had continued the practice with much satisfaction, the ordinary danger being entirely avoided. A little strong nitric acid should be used towards the end of the process.

Mr. Heathfield said that glacial phosphoric acid might have either of two sources: —1st. The heating of phosphate of ammonia strongly. The product of this process was always contaminated by ammonia. 2nd, The combustion of phosphorus in air or oxygen, and the concentration of the resulting acid liquor till it reaches a syrupy consistence, and will gradually deposit crystals. This product was very pure, and adapted for making syrups of the phosphates of iron, which was not the case with the imported acid made by the first method.

Dr. Attfield said that the deoxidation of nitric acid was a source of the production of ammonia in making phosphoric acid by acting upon phosphorus with nitric acid, the hydrogen being supplied by the decomposition of water. This had been repeatedly found, though the quantity of the ammonia was very trifling.

Dr. Parkinson was quite aware of this fact, but had purposely omitted to introduce it, because the quantity of ammonia found in his experiments was far too large to have such a source.

Mr. D. HANBURY had prepared the acid by each process, and subsequently tested it by boiling with caustic potash, when abundance of ammonia evolved from that made by heating the phosphate of ammonia, but no trace was present in the Pharmacopœial specimen.

Mr. HEATHFIELD said that any traces of ammonia formed in the second process which he had named might be got rid of by heating nearly to redness in platinum, but this method was not applicable to the acid made from phosphate of ammonia.

"ON THE ASSAY OF THE ALKALOIDS IN MEDICINAL EXTRACTS. BY T. B. GROVES, F.C.S.

[*Abstract.*]

"The object of the author was to devise a process for estimating the strength of the vegetable extracts used in medicine. The method he employed was a volumetric one. Mayer, of New York, and Valser, of Paris, had worked upon the same subject, and all three had fixed upon the same liquid for precipitating the alkaloid, namely, the iodo-hydrargyrate of potassium. All three also had suggested formulæ for the precipitate. Valser's experiments corroborated those of the author, while Mayer's pointed to a different conclusion. Mayer's experiments were then reviewed, and the details of some reactions given from which it seemed that, on adding the iodo-hydrargyrate to the solution of the alkaloid, a point was arrived at when the addition of either liquid caused a precipitate. In this way some of the apparent anomalies might be explained. If, however, time were allowed for the completion of the reaction, more definite results might be obtained. He described the reactions with strychnia, quinine, cinchonine, morphia, nicotina, and codeia, and reviewed Mayer's results, which were quite, he said, anomalous. In estimating the amount of alkaloid in an extract, the alkaloid must first be isolated as far as possible by Stas's well-known method. In estimating the medicinal value of an extract, more exact methods than those now known must be discovered before accuracy can be attained."

Mr. SCHACHT and other members spoke with warm approval of the laborious and able researches of the author, which had accomplished an end not less important than original discovery, viz. the pointing out of processes which, though highly praised by their authors, could not be relied upon.

"A REPORT AS TO THE PURITY OF COMMERCIAL POWDERS OF IPECACUANHA, JALAP, AND OPIUM. BY F. M. RIMMINGTON.

[*Abstract.*]

"The indications relied on were principally microscopic, to which was added estimation of amount of ash, not assuming that variation in the latter particular would be proof of adulteration, but considering that such a series of estimations would be collaterally interesting. Eleven samples of ipecacuanha from different localities were examined; all appeared to be genuine, and the amount of ash was tolerably constant, ranging from 2·5 to 3·7 per cent., except in one case, where 7 per cent. was found. Nine samples of jalap had also been examined; seven of them appeared genuine, the amount of ash ranging from 5·5 to 6 per cent., while two contained an abnormal amount of woody fibre, and in these the ash was reduced to 3·5 and 4 per cent. respectively. Of eight samples of powdered opium, six were found to contain varying quantities of starch; the percentage of ash was pretty constant, from 5· to 6·5, the variations being independent of the presence of the starch. The author regards the starch as an impurity in the opiums imported, having met with it in this form."

"ON THE PREPARATION OF AN IMPROVED WINE OF IRON. BY H. N. DRAPER, F.C.S., AND MR. J. WHITLA.

[*Abstract.*]

"The authors first described their observations of the action of light in promoting decomposition of the officinal wine of iron. To prevent this decomposition, which occurs even in the dark, they suggested that ammonio-citrate of iron should replace potassio-tartrate, and that citrate of ammonia should also be added, to prevent any slight precipitation that might otherwise occur when the wine was exposed to strong sunlight. The formula proposed was as follows :—

Ammonio-citrate of Iron	160 grains.
Crystalline Citrate of Ammonia	60 ,,
Sherry	1 pint.

The wine thus prepared was perfectly transparent, and had no disagreeable taste."

"ON COMMERCIAL WINE OF IRON, WITH SUGGESTIONS. BY F. SUTTON, F.C.S.

[*Abstract.*]

"Steel wine is well known to vary much in strength. The author obtained seven samples from the leading Pharmaceutical Chemists in London, and estimated the percentage quantity of iron in them, and also the amount of saccharine residue they yielded on evaporation to dryness. The following table exhibits the results of the experiment :—

	Saccharine residue per oz.	Metallic iron per oz.
1.	23¾ grains	0·31 grains.
2.	24½ ,,	0·35 ,,
3.	14¼ ,,	0·70 ,,
4.	21 ,,	0·51 ,,
5.	51¼ ,,	1·76 ,,
6.	17 ,,	1·08 ,,
7.	28¼ ,,	0.43 ,,

"No. 5 was made with tartarated iron. The composition of the rest shows that the less saccharine residue, a specimen of sherry, yields on being evaporated to dryness, the more iron it is capable of dissolving. The metal should be digested in light sound sherry for four months, to obtain the best preparation.

"The examination of a number of samples made with tartarated iron, showed that they contained about one, instead of one and three-quarter grains of iron, the rest having precipitated. The author thought that if a strong, sound sherry were used, and the ingredients allowed to remain in contact for one month, access of air to the vessel being occasionally allowed, a satisfactory preparation could be made by the process."

Mr. Merrikin and Mr. Robbins spoke of the advantage of adding tartaric acid or bitartrate of potash to the wine when making it by the old plan from iron wire. The first-named speaker had found the preparation of the B. P. very unsatisfactory, being returned by customers with complaints that it became muddy.

The President and Mr. D. Hanbury also condemned the new formula, and expressed the opinion that the old preparation must still be kept in hand.

Mr. Abraham differed from these opinions, and thought that the new preparation kept well, whilst he objected to the old one that it retained the flavour of the hydrogen-oil, and often lost its colour so much that caramel had been used to replace it.

Mr. T. B. Groves thought that hydrated oxide of iron and citric acid might be used.

Mr. Reynolds queried if Ferrum Redactum would not be a convenient form of introducing a uniform amount of iron.

"ON THE AMOUNT OF ALKALOID IN COMMERCIAL CITRATE OF IRON AND QUININE. BY MR. J. C. BRAITHWAITE.

[*Abstract.*]

"The author had examined fifteen samples of this medicine, which should contain sixteen per cent. of quinine, or about twenty-five per cent. of citrate of quinine. The following is a tabular form of his results :—

	In 100 parts.	
	Quinine.	Citrate of Quinine.
1.	1·5	2·3
2.	1·5	2·3
3.	3·7	5·8

	In 100 parts. Quinine.	Citrate of Quinine.
4.	4·1	6·4
5.	4·7	7·4
6.	6·0	9·3
7.	7·3	11·5
8.	9·3	14·5
9.	11·2	17·5
10.	12·2	19·1
11.	13·0	20·2
12.	14·7	23·0
13.	14·8	23·1
14.	14·9	23.2
15.	15·8	24·7"

Mr. D. Hanbury called attention to the test ordered in the British Pharmacopœia, which states that ammonia throws down a white precipitate, soluble in ether. Now the fact was, that traces of oxide of iron fell with the quinia, and remained behind after the action of ether. The quantity was too trifling to invalidate the results given by the process.

Mr. Heathfield said that if the solution of citrate of iron had been concentrated by boiling down before sealing, the traces of iron named by Mr. Hanbury would appear, but they would not from a citrate made without heat.

At an afternoon sitting of the Conference, a resolution was proposed by Dr. Edwards, seconded by Mr. Jameson, and carried, "That the next annual meeting of the Conference be held at Birmingham."

On the motion of Mr. Abraham, seconded by Mr. Commans, power was given to the Executive Committee to elect a Local Secretary and other officers resident in Birmingham.

The following gentlemen were balloted for and duly elected as officers for the ensuing year:—

Officers for 1864–5.

President.—H. Deane, F.L.S.

Vice-Presidents.—Prof. Bentley, F.L.S., M.R.C.S.; J. B. Edwards, Ph.D., F.C.S.; J. P. Tylee.

Treasurer.—H. B. Brady, F.L.S., etc., Moseley Street, Newcastle-on-Tyne.

General Secretaries.—J. Attfield, Ph.D., F.C.S., 17, Bloomsbury Square, London, W.C.; R. Reynolds, F.C.S., 13, Briggate, Leeds.

Committee.—J. C. Brough; S. Gale, F.C.S.; T. B. Groves, F.C.S.; D. Hanbury, F.L.S.; A. F. Haselden; J. C. Pooley; B. S. Proctor; F. Sutton, F.C.S.

At half-past five o'clock, a large number of the members dined together at their Rooms in George Street.

After the removal of the cloth, the usual loyal toasts were proposed by the Chairman, Henry Deane, F.L.S. "Success to the British Pharmaceutical Conference" was then given by Mr. J. R. King, in a feeling and telling speech, and acknowledged by the Chairman. "The Health of the Bath Members" was received with great applause by the visitors, showing that the efforts which had been made for the comfort and convenience of all connected with the Conference were thoroughly appreciated. "The Pharmaceutical Society" was next offered as a toast by Mr. Matthews, and responded to by Dr. Attfield, who traced the existence of the Conference to the zeal of the former educational officers of the Society, in annually sending from their school gentlemen able and willing to aid in the advancement of pharmacy. "Success to other Educational Societies" was proposed by Dr. Edwards. "The Pharmaceutica. Press" was acknowledged by Mr. Brough. Other toasts and speeches were given by Messrs. Commans, Jameson, Giles, Mercer, Brady, and Reynolds.

PROFESSOR ALFRED S. TAYLOR'S REPORT ON POISONING, AND THE DISPENSING, VENDING, AND KEEPING OF POISONS.

II.—TO WHAT EXTENT IS INJURY OCCASIONED BY THE CARELESSNESS AND INCOMPETENCE OF PERSONS EMPLOYED IN RETAILING DRUGS?

In reference to this question, I understand that the answer should apply to injury affecting health and life, and that the retailing of drugs refers particularly to the dispensing and vending of drugs and medicine.

Considering this question in its broadest aspect, the first point to which I would refer is, that a large number of persons wholly unacquainted with the properties of powerful drugs and medicines, are allowed to retail them to the public, on demand, without any check or control. Persons who have had no professional education as druggists, and acting as oilmen, grocers, or village shopkeepers, keep for sale laudanum, tincture of rhubarb, senna, black draughts, etc., and either from carelessness in placing the bottles containing these medicines near to each other, or from ignorance, supply laudanum for the tinctures above mentioned, and thus either injure health or destroy life. A friend of mine having sent to a village shop where drugs were sold, for an ounce of tincture of rhubarb, was supplied with laudanum in place of it, and having swallowed it, narrowly escaped with his life. The medicinal tinctures above mentioned are similar in colour to laudanum, and are therefore liable to be mistaken for it; the odour is, however, very different. When it is considered that the bottles are for convenience of retail sale kept near to each other, and generally on the same shelf, and further that the proprietors of the shop frequently entrust the sale of them to boys and girls, some of whom cannot read, it is not surprising that fatal mistakes should be frequently made. The case which I have related above is the type of many which occur annually, but of which the public hear but little, because, as recoveries are numerous, no inquiries are instituted. Even when death takes place there is a general disposition to exonerate the chemist from blame, as will be perceived by two of the following cases.

The first occurred recently. An infant died from the effects of a dose of laudanum administered by its mother in mistake for tincture of rhubarb. A servant lad was sent with a written message for threepennyworth of tincture of rhubarb to the shop of a druggist in a country town. The proprietor himself measured out the liquid, and gave it to the lad. Half a teaspoonful administered by the mother killed the child in a few hours, with the usual symptoms of poisoning by opium. On examining the liquid remaining in the bottle it was found to consist of pure laudanum. The verdict was to the effect that death had resulted from a dose of laudanum given by mistake.

This case occurred at Wigan in January of the current year, and I am indebted to Mr. Grimshawe, the coroner, for a full account of the particulars.* The mistake appeared to have arisen from carelessness on the part of the druggist, and not from ignorance, and it presents a characteristic feature of all such fatal errors in dispensing or vending medicines, namely, the positive denial, as a rule, that any mistake has been made. The druggist made the following statement at the inquest: "The boy came to the shop, and asked for threepennyworth of tincture of rhubarb, and I gave him what I thought was the tincture of rhubarb, and I think so still, for I do not believe I gave him laudanum at all. I have no reason to think I gave laudanum, and nothing has occurred to my mind to lead me to think so." A *juror* asked, "Is the tincture of rhubarb bottle kept near that containing laudanum?" *Druggist.* "They are near together; one or two off each other. One bottle is a little larger than the other." The bottle and its contents were clearly traced to the druggist's shop. A medical man called in to see the child, found it dying under the symptoms usually caused by laudanum, and on asking to see the bottle from which the dose of medicine had been given, he found in it nothing but laudanum. This strong denial of a mistake from inattention or carelessness, in face of facts which prove that a mistake must have been made, has, in more than one instance, led to unfounded charges of murder against innocent persons who have had the care of children. The jury exonerated the druggist, attributing the result to accident, and not to gross carelessness. They suggested, however, that bottles containing poisonous medi-

* See Report in 'Wigan Examiner,' Jan. 8, 1864.

cines or drugs should be distinctly labelled, and not kept on the same shelves close to others which were not poisonous.

A servant was sent to a village shop for an ounce of powdered rhubarb. The person to whom she applied is described as grocer, draper, and druggist to the village. The grocer weighed from a small bottle half an ounce of a powder which he said was all that he had of that kind. The girl remarked that the powder was very dark in colour, which the grocer admitted, but made no further observation. A teaspoonful of this powder with a few drops of laudanum was given to a young woman for whom the rhubarb had been prescribed. In a short time she was seized with symptoms of poisoning by opium, and died the same evening. The powder purchased as rhubarb was found to be powdered opium, without any admixture, and eight or ten grains of opium in powder were found in the stomach of deceased on a post-mortem examination of the body.

The statement made at the coroner's inquest by the person who was guilty of this serious mistake shows the great danger to which the lives of the public are exposed by allowing ignorant and incompetent persons to sell powerful medicines capable of acting as poisons. This event occurred on the 29th April, and the draper-druggist, when called before the coroner's jury, stated "that he took his shop on the 9th of April, with the stock of groceries, draperies, and drugs, including the powdered opium; that he understood from the outgoing tenant that the powder was rhubarb, and he himself supposed so from seeing the word 'Turc.' on the label. He had not a thorough acquaintance with drugs, and sold the powdered opium ignorantly." The jury found that he had been guilty of culpable negligence and ignorance, and returned a verdict of manslaughter against him.*

This case furnishes an instance of the incompetence of village shopkeepers to deal in poisons. The bottle which contained the powdered opium was thus labelled, "Pulv. Opii Turc. Opt." Because rhubarb also comes from Turkey, and is sometimes labelled "Pulv. Rhei Turc. Opt.," the draper had fixed upon the word "Turc." as indicative of rhubarb powder only. If, as he stated at the inquest, his predecessor in the business handed over to him the contents of this bottle as rhubarb, it is not improbable, as rhubarb is a popular medicine for children, that some may have previously died from this complete ignorance of the nature of drugs. The two powders may be easily distinguished by smell and colour, by any one having the slightest acquaintance with drugs.

Another case which occurred in the country furnishes an illustration of carelessness in a druggist and incompetence in a shopkeeper. A mother wishing to give a dose of tincture of rhubarb to her child applied for this medicine at a small village shop kept by a woman who dealt in apples, sweetmeats, spirits of nitre, tincture of rhubarb, castor oil, etc. It does not appear that laudanum was among the articles which she professed to sell. After two doses of the medicine had been given to it, the child was seized with the usual symptoms of poisoning by opium, and died in the course of a few hours. The liquid sold at the village shop as tincture of rhubarb was found to be tincture of opium; and it then transpired that the shopkeeper had procured it of a regular druggist in a neighbouring town. It had been sold by an apprentice to this druggist as tincture of rhubarb. The coroner's jury found that the deceased had been accidentally poisoned by an overdose of laudanum; and the apprentice who had made the mistake was discharged with a caution.†

It would be easy to accumulate instances of this kind, but those above mentioned may suffice to show that by ignorant, incompetent, or careless persons, life is frequently endangered by reason of opium in tincture or powder being mistaken for rhubarb.

Antimonial wine is occasionally employed by the poorer classes as a medicine for children. In the following case, colchicum wine, a powerful poison, was supplied by mistake for the medicine. A mother was advised to give to her child, suffering from diarrhœa, a dose of antimonial wine. She applied for it at a regular druggist's shop, and she was served by a youth, 16 years of age, who was not acquainted with the nature of drugs. Several doses of the wine were given to the child, which led to its death on

* See Pharmaceutical Journal and Transactions, June, 1858, p. 627.

† See Pharmaceutical Journal and Transactions, April, 1859, p. 528. Other cases, similar in their details, are reported in the same journal for September, 1856, p. 195, and October, 1863, p. 186.

the following day, and the liquid remaining in the bottle was found to be wine of colchicum, which had been sold by mistake. The coroner's jury dismissed the druggist with a reprimand.*

The sale of oxalic acid, nitre, and other saline compounds of a noxious kind, for Epsom salts, has been a frequent cause of death. The facts of the subjoined case, which occurred in December, 1863, at Oswestry, were communicated to me by the medical gentleman who was called to see the deceased:—

The deceased applied to a druggist for some Epsom salts. He was served with eight packets. One of them, equivalent to an ounce in weight, he mixed in water, and swallowed about nine o'clock in the morning. He died under symptoms of irritant poisoning in less than three hours. The packets were labelled "Purified Epsom Salts;" but when examined they were found to contain nitrate of potash in powder. The nitre had caused death, with the usual symptoms of irritant poisoning. It was admitted at the inquest that the powdered nitre and Epsom salts were kept in drawers close to each other, and thus the mistake had arisen. The boy who made the mistake was seventeen years of age. The verdict was to the effect that the man had been poisoned by nitre; but the druggist, whose business was thus carelessly conducted, was exonerated from all blame.

A man went into a druggist's shop in London to purchase two ounces of Epsom salts. Hearing they had a taste, he asked the apprentice who supplied him to exchange them for tasteless salts (Rochelle salt). An exchange was made, and the man swallowed an ounce of the substance which had been given to him. He was seized with symptoms of irritant poisoning, and died after nine days, suffering in the meantime from inflammation of the stomach and bowels. It was found that the apprentice had supplied him with tartaric acid, in place of the tartrate of potash and soda. The druggist, who admitted the mistake, was subsequently tried on a charge of manslaughter. It was contended in the defence, that the drug had been supplied in error and by mistake, and not with that gross and culpable negligence which would constitute the crime of manslaughter. The jury acquitted him.†

Several cases have come to my knowledge in which oxalic acid has been retailed in place of Epsom salts. In one of them, which occurred in London some years since, a man was sent to the shop of a respectable druggist for four ounce-packets of Epsom salts. He was served with four packets, labelled as usual "Purified Epsom Salts." In the evening, the gentleman who had sent for the salts took the contents of one of these packets; he was seized with the usual symptoms of poisoning by oxalic acid, and died in a few hours. I examined the contents of the stomach, and found oxalic acid therein, and I also found that the three unopened packets contained oxalic acid, labelled as above described.

In another instance in which I was consulted, a gentleman on a visit to London entered a shop of a respectable druggist, and asked for an ounce and a half of Dinneford's fluid magnesia. The druggist poured a liquid from a bottle into a glass, but when the applicant took a portion of it into his mouth, he found that it was some caustic burning fluid. On looking at the bottle, he saw that it was labelled "Burnett's Disinfecting Fluid." He subsequently suffered from severe pain and vomiting; and medical men who saw him stated that his symptoms were such as Burnett's fluid (chloride of zinc) would produce. He recovered after nine days, and brought an action against the druggist, in consequence of his having negligently given him an irritant poison in place of medicine. The defendant denied having given him Burnett's fluid, which he did not keep, although he kept chloride of zinc in his shop, and said that he had poured out a solution of Epsom salts. This would not, however, have accounted for the symptoms from which the plaintiff had suffered. A verdict, with £75 damages, was returned against the druggist.‡ Owing to similar mistakes, and chiefly owing to fluid magnesia and disinfecting fluid being sold in similar bottles with somewhat similar labels, several lives have been destroyed.

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* Pharmaceutical Journal and Transactions, February, 1859, p. 438.

† The case of the Queen against Watkins, Central Criminal Court, January, 1845. See also Pharmaceutical Journal and Transactions, February, 1845, p. 370.

‡ Richards *v.* Cocking, Guildhall, July, 1858. See Pharmaceutical Journal and Transactions, August, 1858, p. 139.

In a case in which I was consulted, and which led to a trial for murder at the Central Criminal Court, it was proved that powdered white arsenic was kept on a shelf near to bottles containing calomel and sugar, and other white powders resembling arsenic. A dose of four grains of calomel was prescribed for an infant late at night. Arsenic was supplied in place of calomel. The child died, and on examining the stomach, arsenic in powder, in quantity nearly corresponding to the above dose, was found in that organ, but no calomel. The child was dying from intussusception when the supposed calomel was given; but the discovery of arsenic in the stomach, led to a charge of murder against the mother and grandmother who had had the care of the child, and had given to it its food and medicine during its illness. On proof of the facts above mentioned, *i.e.* that arsenic and calomel were kept on contiguous shelves in the same shop, and that no calomel was found in the body, and no motive for poisoning could be suggested, the learned judge stopped the case, and the jury acquitted the accused of the charge.*

The dispenser who compounded the medicines in this shop, strongly denied that any mistake had been made. The following is an extract from his evidence:—

"The powder was white. I know that white arsenic was kept in the shop, but I did not sell any arsenic that night. *By the Court.*—I should not know calomel from arsenic by its appearance. I don't know whether arsenic is rougher in appearance than calomel. I never examined them together. I cannot say whether calomel being mixed with sugar would give it still more the appearance of arsenic. *Mr. Clarkson* remarked that he thought it was fortunate for the public that this gentleman (the witness) had not succeeded to the retail drug business of his uncle."

The late Dr. Snow communicated to me the following case:—The parents of a child sent to the shop of a provincial druggist for a pennyworth of magnesia. It happened that the druggist was not in the shop at the time, and his assistant, a youth, dispensed arsenic by mistake for magnesia. The poison was given to the child; the usual symptoms followed, and the child died.

A superintendent of police, in endeavouring to trace out the sale of poison in reference to a case of alleged murder, informed me that on entering the shop of a provincial druggist on a market day he saw on the counter a bottle of white arsenic in powder near several other bottles containing white powders, which he was informed were of a medicinal nature.

Most of the cases above mentioned may be traced partly to carelessness, and partly to incompetence and gross ignorance, on the part of those who are allowed to retail drugs to the public. The injurious effects of such incompetence and ignorance on the health of the public, and the great danger to life, are increased a hundredfold by reason of the carelessness displayed in keeping innocent medicines and poisonous compounds resembling each other on shelves or drawers in close proximity. The plea for this practice is that laudanum is a drug as much or even more in request than tincture of rhubarb or senna, and it requires to be as much within the reach of the vendor. The bottles are commonly of the same size and shape, with similar labels; and the system of labelling usually adopted, namely, the use of abbreviated Latin words, is no doubt a fertile source of mistakes. Three bottles of similar shape may be thus labelled,—TINCT. OPII (Laudanum), TINCT. RHEI, TINCT. SENNÆ. Each label, as I have had occasion to notice, commences with a similar abbreviation; and a bottle containing laudanum (Tinct. Opii), turned a little on one side, as the liquids have a similar colour, may easily be mistaken for one of the other two. The bottles may sometimes be misplaced, and thus, without looking at the label, but deceived by the position of the bottle, the poison may be dispensed for the medicine.

Among those ignorant persons who keep village general shops for draperies and groceries, and who deal in certain drugs and poisons, the mistakes are not only more frequent but more serious in their consequences to health and life. It would be difficult to define to what extent the public health suffers in this respect; for symptoms of poisoning are so apt to be mistaken for bowel complaints, fits, or convulsions, especially when death is not the immediate result, or a person has been for some time ill, that such cases are generally set down to disease, and the deaths are registered accordingly. A closer scrutiny would probably show that poison carelessly sold, in a state of

* The Queen against Dore and Spry, Central Criminal Court, August, 1848. See also 'London Medical Gazette,' vol. xlii. 1848, p. 888.

mixture with common articles of food, or a poison sold for medicine, may have been the real cause. Even in the event of death taking place, as no suspicion exists among the neighbours, and *post-mortem* examinations and analyses are not made, except when strong suspicion has been excited by moral circumstances, such cases are necessarily overlooked.

Among various instances of the sale of poisoned food that have come before me during the last thirty years, illustrative of the effects of carelessness and ignorance combined, are the following:—

A man died from the effects of some oatmeal purchased at a village general shop, where drugs and poisons, including arsenic, were sold. The death of this man from arsenic led to a suspicion that a murder had been perpetrated by some member of his family. Some oatmeal procured at the same shop was found to contain arsenic in quantity sufficient to destroy life. The meal was kept in a large drawer, divided into a number of parts by loosely fitting wooden partitions. In one of them white arsenic in powder had been kept, and the poison had diffused itself through the contents of the different divisions of the drawer, thus giving to all of them, more or less, poisonous properties. Several articles of food in common demand were found to have been accidentally poisoned. How many persons had suffered in health from this carelessness in keeping arsenic, before attention was drawn to the fact by the occurrence of a sudden death from poison, it is now impossible to state.

Another instance occurred recently in one of the northern counties, which brought to light two cases of death from the criminal administration of arsenic one and nearly two years previously. A man in a respectable position of life as a small farmer kept a village general shop, where rice, arrow-root, sago, and other articles of food were sold. He also kept arsenic for sale. Some ground rice was purchased at this shop by a neighbour, and seven or eight persons were made seriously ill and nearly killed, in consequence of eating a pudding made with a portion of this rice. An action for damages was brought in the county court against the shopkeeper, but this was decided in his favour, on the ground that the arsenic might have got into the rice by accident. It transpired, however, that other persons had suffered from symptoms of poisoning by reason of their partaking of food from this shop, and it was then remembered that the wife of the shopkeeper had died suddenly twenty-one months before, and his mother had also died a year before this date. Their bodies were exhumed, and it was found that they had both died from the effects of arsenic. This led to the trial of the shopkeeper and a woman whom he had married after the death of his wife, for murder. It came out in evidence that arsenic was so carelessly kept in the shop that it might have become mixed with various articles of food (arrow-root) given to the wife and the mother during their illness, and thus have accidentally caused the deaths of both. The jury returned a verdict of manslaughter, and the prisoners were sentenced to penal servitude for life. But for the simultaneous illness of so many members of a family who had partaken of food procured at this village shop, their violent deaths by poison would probably have remained unknown to this day.*

The superintendent of police, who gave evidence at the trial, made the following

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* The Queen against Garner and Wife, Lincoln Lent Assizes, 1863. It is worthy of remark, that an inquest was held on the body of the wife immediately after her death in March, 1861, and the jury returned a verdict to the effect "that deceased died suddenly from natural causes by visitation of God, and not from any violent cause." When the present experienced coroner for Boston, Mr. Walter Clegg, heard of the sale of this poisoned rice, etc., he, upon his own responsibility, ordered the exhumation of the bodies of the wife and mother of the male prisoner. The result of the inquiry showed that he had taken a correct view of the facts. The medical gentleman who attended the wife in her illness, candidly admitted that at the time he had no suspicion that poison was the cause of the symptoms.

I am indebted to Mr. Justice Willes for a note on a similar case. A woman named Alice Hewitt was tried before him at Chester Winter Assizes, December, 1863, and convicted of poisoning her mother with arsenic in the month of March preceding. Although the symptoms of irritant poisoning were very clearly marked, a medical man who attended her certified the cause of death as gastro-enteritis. Eleven weeks after the burial of the deceased, the body was exhumed and examined, when as much as 154 grains of arsenic were found in the stomach and contents. It was proved that shortly before her mother's death, the prisoner had purchased a quarter of a pound of arsenic for threepence, and had insured her mother's life in one of the local clubs, by causing a woman to personate her. This statement respecting the discovery of arsenic in the shop:—"I went into the shop, and saw Whittaker and Garner (the two prisoners), and the former pointed out the place where the arsenic was kept. It was placed upon a shelf under the counter. There would be half a hundredweight at least, in pound and half-pound packages. I saw a pound packet of white arsenic which had been broken into; it was three and a half ounces deficient. It had evidently been recently broken open, but neither Garner nor Whittaker could account for it. Both asserted it had been recently opened. The string was cut, and not to be found. They complained that the parcel had been opened by some one who had no business to open it. There was another parcel, which had been open some time, as it was very dirty, and both stated that this package only should have been broken into. It contained white arsenic."

In reference to this discovery of the mode in which arsenic in large quantities was kept in a village shop, it may be stated that during the illness of the prisoner's wife in March, 1861, she was attended by a woman who gave her arrow-root and milk, the former being procured from the shop. The woman used occasionally to taste the arrow-root, and she suffered like the wife from sickness and purging. The wife died, as it was afterwards proved, from the effects of arsenic; and the nurse suffered from paralysis, as a result of the action of arsenic, and was for a period of ten weeks an in-patient at an hospital. Nearly two years after the death of the wife and the illness of the nurse, the police took from the prisoner's shop a large drawer, labelled in ink-writing on paper, "Arrow-root and Baking Powder. 2*d.* per oz., 2*s.* per lb." This was submitted to me for analysis. The drawer contained a pound and a quarter of starchy powder, having the appearance of common arrow-root. On analysis, it was found that this arrow-root was mixed with about 140 grains of arsenic. All parts of it were more or less poisoned, and a tablespoonful, weighing 550 grains, yielded nine grains of white arsenic. There was no baking powder in the drawer. The drawer had no cover, and was one of many, opening as usual from the counter, without anything to indicate the deadly nature of its contents. Any person applying for arrow-root or baking powder might have been served from this drawer. There was no evidence, how, when, or by whom the poison was mixed with the arrow-root.

The death of the Rev. Dr. Alexander, in April, 1857, shows that no class of society is safe against mistakes of this nature. On the 16th March a servant was sent to the shop of a grocer in Ferbane, for one pound of arrow-root. The shopman, not having so much in the bottle which he placed on the counter, took from a paper parcel a sufficient quantity of a white powder to make up the proper weight. Arrow-root was prepared with it in the usual way, and Dr. Alexander, his daughter, and two of his servants partook of it. They all suffered from symptoms of poisoning by arsenic, and Dr. Alexander died from the effects of the poison on the sixteenth day. The white powder which the shopman had employed to make up the deficient weight, was proved to be white arsenic. Dr. Alexander's steward, who went to the shop after the accident to make inquiries, found rice, corrosive sublimate, jalap, and oxalic acid in different papers in the same drawer, and all under the care of an ignorant boy.*

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murder by arsenic, as well as the two mentioned in the text, are necessarily entered in the returns of the Registrar General as deaths from natural causes.

When causes of death are certified as cholera, choleraic, or bilious diarrhœa, gastro-enteritis, convulsions, etc., without any inspection of the body, the fact that there may have been really symptoms of poisoning is altogether overlooked. At the trial of Catherine Wilson for murder at the Central Criminal Court in September, 1862, I declined to accept a certified cause of death from disease, as a proof of the real cause, believing it, as it was proved to be by the conviction and execution of the prisoner, a death from poison overlooked in its true features at the time of its occurrence. I then stated that on eight different occasions I had given evidence at inquests, or on trials for murder by poison, in which death had been certified from natural causes; and on exhumation of the bodies, many months afterwards, poison was found in them, and this had really been the cause of death. That statement was at the time received with something like incredulity on the part of the counsel for the prisoner. Since that trial I find, on reference to my notes, that I have examined sixteen exhumed bodies where death had taken place from poison, and natural causes had been certified. This number is exclusive of three exhumations of the victims of Catherine Wilson. Here natural causes had been certified, although, as the learned judge, Mr. Justice Byles, remarked, the deceased persons had been destroyed by poison.

* See 'Medical Times and Gazette,' April 18, 1857, p. 38.

In reference to the cases of illness and the number of deaths caused annually in this country by carelessness in retailing drugs or poisons for medicines, it would not be possible to give an opinion without a correct return of inquests held by coroners, and a reference to the books of medical practitioners. The cases which are accidentally brought to light, render it probable that many escape notice altogether. With regard to the number of persons who are injured in health, but recover from the effects of such carelessness, they can be known only to the medical men whose assistance may be required. They seldom come before the public, but are occasionally reported in the medical journals. The deaths of children from opiates are very numerous; but here, probably, the greater number are to be attributed as much to carelessness in those who administer, as in those who retail the various opiate preparations commonly given to children.

Cases have come to my knowledge in which strychnia has been dispensed by mistake for salicine, morphia, and jalapine, and has caused death. This has arisen, not so much from incompetence on the part of the dispenser, as from *carelessness* in keeping drugs of a similar appearance (some highly poisonous and others not) contiguous to each other, in similar bottles, indistinctly labelled. In such cases, death is likely to be assigned to natural disease, the dispenser not being aware of his error, and no inquiry made; and the medical man probably finding a sufficient cause for the symptoms by reference to exposure to cold or wet, or to the effects of disease.

The extent of injury to the public cannot, however, be measured by the number of deaths, even if recognized and accurately recorded. In numerous cases the effect of noxious drugs dispensed for medicines is to undermine health, and to cause injury which may affect a person for life.

There is also another source of mischief which may arise from these mistakes. As a dispenser, acting *bonâ fide*, is never aware when a mistake has been made, and almost always denies it in the strongest language, it follows that those who may have given food and medicine to the deceased, and who have been in attendance upon him up to the last hour, are exposed to a false accusation of administering poison. If poison is found in the body or in the medicine, this is considered to be of itself a sufficient proof of the charge, and even the absence of motive or moral circumstances will not always suffice to show that the charge is groundless. The proof of the mistake, if denied, will in general rest upon presumptions. A false charge of murder, arising out of careless dispensing, is easy to be made, and hard to be disproved, as there can rarely be immediate access to the bottles or drawers of a shop to establish the fact upon undeniable evidence. One case has been referred to in this report (page 747) which impressed the late Baron Platt, who tried it, with the great uncertainty of evidence in such cases, up to the last hour of his life. Many years after the trial, in discussing the case with me, he referred to the details of evidence, as showing how such a mistake by a dispenser, with his absolute denial of it on oath, might have led to the conviction and execution of two innocent persons.

II.—TO WHAT EXTENT ARE UNNECESSARY FACILITIES GIVEN FOR THE PURCHASE OF POISON FOR CRIMINAL PURPOSES?

There is no legal restriction on the sale of any poison excepting *arsenic;* but the statute for regulating the sale of this poison is a dead letter, so far as the public safety is concerned. According to the provisions of the statute (14th Victoria, cap. 13, sect. 3), no person is allowed to sell arsenic in smaller quantities than of ten pounds weight, unless it is previously coloured with a certain proportion of soot or indigo; but in several cases of criminal poisoning (two occurring in 1863), which I have been required to investigate, involving charges of murder, uncoloured or white arsenic has been used as the instrument of death. Its great cheapness (one penny to twopence an ounce), places it within the reach of the poorest person. It is sold to any applicant on the most frivolous pretences; and even in the coloured state it affords but little protection, except when it is mixed with liquids. The better class of druggists do not sell arsenic by retail; the grocer, chandler, oilman, and village shopkeeper, are the principal vendors of this poison; and it is clear, from the numerous deaths which take place from white arsenic, that they set the law at defiance, and sell the poison in an uncoloured state, in which case it may be readily administered in any article of food, without exciting suspicion.

Nux vomica in powder is also easily procurable, under the usual pretext, that it is intended for the destruction of vermin. In one instance of attempted murder which I was required to investigate, a mere youth had been able to procure a quantity of this poison, and had attempted to destroy the life of his mistress, by mixing it with milk prepared for her breakfast.

Strychnia, morphia, veratria, prussic acid, the oil of bitter almonds, and preparations of colchicum, are not commonly found in the shops of the lower class of druggists or village shopkeepers, and they are not retailed to strangers, without due inquiry, by the respectable class of druggists who keep them; but there is no impediment to their sale except that which may arise from conscientious feelings on the part of the vendor, or from his suspicions being aroused by the statements of the person who asks for such potent drugs. If the applicant is prepared to pay for them, and to assign a plausible reason for the purchase, he will find no great difficulty in procuring them. In one instance, an ounce of wine of colchicum was supplied to a maid-servant by a druggist, and it was employed for a criminal purpose. The servant had been directed to state that the wine was required as drops for the treatment of rheumatic gout. It was used as a poison, and destroyed life.

There are unnecessary facilities given for the purchase of a variety of noxious drugs, such as oil of savin, cantharides, tincture of ergot of rye, and tincture of the perchloride of iron, which are employed for the purposes of criminal abortion. Corrosive sublimate, the sulphates of copper, iron, and zinc, and other mineral irritants, are easily procured upon false pretences, and are then employed to procure abortion. These drugs, thus used by ignorant persons, either lead to the destruction of life, or seriously injure health. In one instance within my knowledge, arsenic was purchased and given as an abortive: it destroyed the life of the woman, without causing abortion; in another instance, which was the subject of a recent trial, the health of the female was completely broken up by the effects of large doses of tincture of perchloride of iron. The tincture had been procured by a farm labourer, without any difficulty, at the shop of a man who had been regarded as a respectable druggist. It was clearly proved that he was cognizant of the purpose for which this drug was required, and he was convicted.*

There are two poisons of a most potent kind which can be readily purchased even by boys and girls, either at the village shop or at the druggist's. These are *strychnia*, sold under the name of Butler's vermin killer or Battle's vermin killer, and *cyanide of potassium*. The first is professedly sold for destroying vermin; but it has been the means of death in many cases of murder and suicide, some of which have come under my notice. These two popular vermin-killers are mixtures of strychnia with flour or farinaceous meal, coloured either with soot or Prussian blue. A threepenny packet contains, according to my analysis, one grain of strychnia, and a sixpenny packet two grains. In the threepenny packet there is sufficient poison to destroy the lives of two persons. The following recent case, in which I was required to give evidence, may be taken as an illustration of the dangerous facilities which exist for the sale of this deadly poison. A girl, aged only thirteen years, was tried for the murder of her master's infant, whom she had been employed to nurse. It seems that the child was restless, and gave the girl some trouble. The girl went to a village grocer's shop, and procured, without any difficulty, a packet of Battle's vermin killer. She took the opportunity of her mistress's absence from the room, to put a small portion of the powder into the infant's mouth. It died in a few hours with the usual symptoms of poisoning by strychnia. It turned out upon inquiry that this child had acted as nurse to infants in other families; and on two previous occasions, the infants entrusted to her care had also died suddenly in convulsions, as it is believed from the administration of this deadly poison! She was found guilty of manslaughter, and sentenced to penal servitude.†

So long as such facilities are given for the purchase of strychnia at a cheap rate, in village grocers' shops, by mere children, so long will it be useless to place restrictions on the sale of other and less potent drugs. Respectable druggists refuse to sell these powders, or strychnia in any form, but the sale of them has become a profitable branch of trade in the shops of oilmen, grocers, and others. As strychnia can be purchased for less than a penny per grain, the profit on the sale of these dangerous powders cannot be less than 200 per cent.

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* Regina *v.* Rumble, Lincoln Lent Assizes, 1863.

† The Queen against Elizabeth Vamplew, Lincoln Summer Assizes, 1862.

The *cyanide of potassium* is another deadly poison, which is fatal to life in small doses, and from its great solubility in liquids it admits of being easily administered in a poisonous dose. It is largely used in photography, and under the pretence that it is required for this purpose, it may be easily procured at a cheap rate in large quantities from dealers in photographic chemicals, and from druggists generally. It is not used in medicine, but is much employed in the arts, and has caused death in numerous instances.

The trade in poisons in this country, may be considered to be as open and free as it possibly can be. I doubt whether by any Act of Parliament, greater facilities for the purchase of poison for criminal purposes could be given. No one wishing to destroy another by poison and having the knowledge to make a selection among drugs, can meet with any difficulty in carrying out his design. If refused at one shop, he can procure the poison at another. If refused by a druggist, he can procure it at a grocer's. If refused at a grocer's, he can procure it at a village general shop, where poisons are retailed by girls and boys, and no questions are asked. So long as a person of any age has the command of threepence, he can procure for this sum a sufficient quantity of one of the most deadly poisons to destroy the lives of two adults. There is surely here great and unnecessary facility given for destroying human life, under the pretence that the poison is intended for the destruction of vermin.

In the course of more than thirty years' experience in investigating charges of poisoning, I have met with a large number of cases in which murder and suicide have been perpetrated or attempted, as a result of the dangerous facilities which exist for the purchase of poisons.

I believe that respectable druggists in town and country throw every impediment in the way of the purchase of poison. Some poisons would not be sold to strangers under any circumstances; others, of a quasi-medicinal character, would be sold only under the prescription of a medical man, or upon the written order of some medical practitioner known to the druggist. They will also question the person who proposes to purchase a poisonous drug, respecting the intended use of it; and if his answers are not quite satisfactory, they properly refuse to serve him. A leading chemist of London who deals in poisons of a deadly kind, informed me that about the time of the trial of William Palmer, when the public mind was so much excited on the subject of secret poisoning, a respectable person entered his shop, and required him to make up a grain of aconitia, the alkaloid of monkshood, into ten pills, representing that they were required for medicinal use. The druggist, knowing the properties of the alkaloid, refused to serve him, and informed him that if he had any knowledge of the drug, each pill would form a dangerous, if not a fatal dose. Admitting that public safety is thus in some cases well looked after by respectable druggists, it must be borne in mind that they form only a small proportion of those who are allowed to retail poisons; and that after all, health and the security of life are to a certain extent left to their discretion. The lower class of drug dealers, including grocers, oilmen, and the general shopkeepers of villages, have no such scruples; and although, if we except strychnia, many of the more potent poisons are not found in their shops, they have still a sufficient number of noxious drugs to endanger health and life, by reason of the facility with which they dispose of them to the public.

The careless custody of poisons is a fertile source of danger to the public. They are either not labelled, or so imperfectly, that they are liable to be used on a large scale by mistake for other substances which they resemble. Orpiment may be sold by mistake for chromate of lead, turmeric, or mustard. In a set of cases which occurred in June, 1862, about forty members of a volunteer corps suffered from symptoms of arsenical poisoning in consequence of having eaten cheese which was found to contain arsenic. The poison had probably been ignorantly used in the state of orpiment for colouring the cheese. In December, 1859, six persons suffered severely from the usual symptoms of poisoning by arsenic, owing to their having eaten some Bath buns purchased of a confectioner at Clifton, near Bristol. This confectioner, wishing to improve the appearance of his buns by giving to them a rich yellow colour, sent for some chrome yellow (chromate of lead, which is itself a poison), and mixed what he supposed was the chrome yellow with the dough. The druggist to whom he applied, ignorantly supplied him with orpiment or sulphide of arsenic, and this mistake gave rise to a degree of illness the real extent of which could not be ascertained. An analysis of the buns proved that sulphide of arsenic, or orpiment, was the yellow-colouring ingredient.

In November, 1858, a confectioner at Bradford wishing to adulterate his peppermint lozenges with some cheap white material in order to save the cost of white sugar, sent a boy to a druggist for 12 pounds of "daff" (plaster of Paris, or sulphate of lime). The druggist, being at the time ill, directed his shopboy, a lad eighteen years of age, and who had been only three weeks in the business, to procure the "daff" from an attic in which it was kept with other chemicals. The boy was simply told that the "daff" was in a cask in the corner of the attic. He found a cask containing something white, which he concluded to be the article required. He weighed out *twelve pounds* of what he thought was plaster of Paris, but which was subsequently proved to be *white arsenic*. The confectioner mixed this large quantity of poison with four pounds of gum and water, forty pounds of sugar, and an ounce and a half of peppermint. The whole was made into lozenges, and delivered to a dealer in four parcels for sale in the open market on a Saturday. The man who made the lozenges suffered severely from sickness, from one o'clock until nine at night, without any suspicion of the cause. Large quantities of the lozenges were sold at the remarkably low price of two ounces for three-halfpence, the admixture with the supposed plaster of Paris enabling the dealer to sell them at a great profit at this price. Many persons purchased two ounces, this quantity containing about half an ounce of *arsenic*. Some of the lozenges were subsequently found on analysis to contain nine grains and a half of the poison; others from eleven to sixteen grains. On an average each lozenge contained one-third of its weight of arsenic.

Some children who had partaken of the poisoned lozenges died on the evening of the day on which they had purchased them, and it was at first supposed that they had died from a severe attack of cholera. On the following day other persons were attacked with similar symptoms, and it was then found that all who had thus suffered had partaken of lozenges purchased of the same dealer in the market on Saturday. It was difficult to determine the exact amount of illness and mortality caused by this serious mistake; but I have been informed on good authority that more than 200 persons who had eaten the lozenges suffered from the usual symptoms of poisoning by arsenic, many of them in so severe a form that seventeen died, twelve from acute poisoning and five from the secondary or chronic effects of arsenic. Many were for a long time ill.*

The druggist who sold the arsenic by mistake for plaster of Paris was tried at the York winter assizes in 1859 on a charge of manslaughter, and acquitted by the direction of the judge, the late Baron Watson. He directed the jury that there had been no negligence in the case, to make the prisoner or any one legally responsible for the deaths of those who had eaten the lozenges. *Criminal* negligence must be proved, in order to convict a person of manslaughter under such circumstances.

The facts in reference to the custody of the arsenic were these:—A police inspector visited the attic or loft where drugs were kept, and he found a cask containing two hundredweight (224 pounds) of arsenic, two or three yards from the corner of the room. There was no label on it; but it was subsequently found that the cask was resting on the labelled end, and was too heavy to be turned over,—hence it was not visibly labelled. In the same room, but in a corner, was the "daff," or plaster of Paris, in a *similar cask*. A boy of only three weeks' experience in a druggist's shop, was thus sent with verbal directions to procure plaster of Paris in a loft in which a large quantity of arsenic was kept in a similar cask, and without any visible label. He was not required to bring the sample to his master to let him see that no mistake had been made, but to make the best selection that he could from a three weeks' experience in drugs. The loss of *seventeen lives*, and the serious illness of *one hundred and eighty-three persons* were the results of this mistake, and no negligence could be legally established against any one! The learned judge remarked that "he did not know that a man could do more (than the druggist had done), except not keep arsenic."

The case, however, conveys this warning, if we desire to prevent the wholesale destruction of life. If arsenic and plaster of Paris, which present a somewhat similar appearance in powder, are kept in similar casks in the same loft, they should be at least plainly and distinctly labelled, so that no mistake could be made by even an experienced man. If, however, the poison and the innocent substance are kept in the same place in similar casks unlabelled, a youth of three weeks' experience in drugs, who admitted that he

* See Pharmaceutical Journal and Transactions, 1858, pp. 297, 340, and January, 1859, p. 390

could not distinguish arsenic from plaster of Paris, was not a proper person to send to make the selection upon a conjecture. Had the cask of arsenic been labelled, as it should have been, in a visible and conspicuous manner, this great destruction of life and injury to health would not have occurred. It will be seen that the evil of adulteration in selling plaster of Paris for white sugar was the main cause of this wholesale slaughter.

A large number of cases of poisoning by *sugar of lead* occurred at Stourbridge, some years since. By some negligence or carelessness, about *thirty pounds* of sugar of lead in powder were mixed at a miller's with eighty sacks of flour, and the whole was made into bread by the bakers, and supplied as usual to their daily customers. According to the report of Mr. Bancks, no fewer than *five hundred persons* were attacked with symptoms of lead poisoning, after partaking of this bread. In a few days they suffered from a sense of constriction in the throat, pain at the pit of the stomach, violent cramps, dragging pains in the loins, and paralysis of the legs. There was obstinate constipation; the pulse was generally slow and feeble; the countenance anxious and sunken, frequently of a peculiar livid hue. Other symptoms characteristic of lead-poisoning were present. It is remarkable that not one of the cases proved fatal; for among the more severe there was great prostration, with collapse, lividity of the face, universal cramps, and other alarming symptoms. After apparent recovery, some of the symptoms returned in a more aggravated form without any obvious cause, and for a long time the patients were out of health. The quantity of sugar of lead taken by each person could not be determined, as on analysis the samples of bread were found to be very unequally impregnated with the poison.*

The following is an additional illustration of the danger to health and life which may occur from the reckless use of poison under circumstances in which such use would not be suspected. In December, 1857, I was consulted on the chemical nature of a liquid which had caused symptoms of poisoning among the children at a large industrial school at Norwood. Soon after their usual breakfast on bread and milk, *three hundred and forty children* had been suddenly seized with violent vomiting, purging, and other symptoms of irritant poisoning. The only cause to which the illness could be assigned was a green-coloured liquid, some of which had been put into the steam boiler on the previous night, for the purpose of cleansing it of fur. A portion of this water had been drawn off in the morning, in order to mix it with the milk for the children's breakfast. An analysis of the liquid speedily showed that it consisted of a strong alkali holding dissolved a large quantity of arsenic: it consisted of arsenite of soda in its most concentrated form. Remedies were suggested accordingly, and all the children were placed under active treatment, which was so effectual that not one death took place. The history which I obtained of this wholesale poisoning was as follows:—The engineers who had fitted up the steam boiler had directed one of their workmen to employ two gallons of this cleansing liquid, of the poisonous nature of which no information was given to any one in the establishment,—to remove the calcareous deposit in the boiler. This quantity, containing, as I found by analysis, about *nine pounds of arsenic*, was well mixed with the water in the steam boiler. Fortunately, only four gallons of the poisoned water were drawn from the boiler on the following morning. It was mixed with thirty gallons of milk, and divided among 340 children, about a gallon of the mixture being shared by ten children. Upon an average each child took a *grain of arsenic*, more or less. The symptoms from which these unfortunate children suffered were severe pain, vomiting, purging, shivering, and discharge of mucous fluid from the nose. Seven had cough of a croupy character, three vomited blood, and one passed blood from the bowels. Some suffered from inflammation of the stomach; of these, six only were under treatment at the end of the first week, and one did not recover until after the second week. The escape of these children may be attributed to the great dilution of the arsenic in the water of the boiler, its still further dilution by the large proportion of milk with which it was mixed, and the early and active treatment to which they were subjected.

As there was no loss of life, no legal question arose here in reference to simple, gross, or criminal negligence. No proceedings could be taken against the parties under the Arsenic Act, because the poison had not been *sold*. The great danger to life, however, was unquestionable; and had the workmen put eight gallons instead of four into the boiler, to give it an additional cleansing, it is probable that there would have been 340

* See Report by Mr. Bancks, Lancet, May, 5, 1849, p. 478.

deaths in this establishment. As it was, each child had taken a quantity just within the fatal dose of arsenic.

This poisonous liquid for cleansing boilers appears to be still in use in some quarters, for in December, 1863, an inquest was held in the east of London on the body of a man who by mistake had drunk some beer from a can which had contained the arsenical cleansing liquid. He died from its effects, and five other men were made seriously ill.

From the cases recorded in this report, it will be perceived that, without defining the precise extent of the evil, injury to health and danger to life frequently result from the ignorance, incompetence, and carelessness of persons who are employed in retailing drugs; and that those criminals who are disposed to destroy life by poison have the greatest facilities afforded to them for this purpose. Further, the careless custody and reckless use of poisons lead occasionally to a large amount of illness, and in some instances cause a great destruction of life.

The suggestions which I beg leave to offer for diminishing these evils are :—

1. That none but qualified persons, educated to the trade of druggists, should be allowed to vend by retail drugs or medicines capable of acting as poisons.
2. That the sale of poisonous drugs by chandlers, grocers, oilmen, drapers, or small shopkeepers should be strictly prohibited.

   [A licence might, if necessary, be granted, enabling these persons to sell certain specified medicines used by the poorer classes.]
3. That the sale of arsenic, strychnia, and other specified poisons should, after a certain date, be restricted to Pharmaceutical Chemists and Licentiates of the Apothecaries' Society. Any other persons acting as druggists not to be permitted to sell them, until they have proved their knowledge of poisonous drugs by undergoing a proper examination.
4. Under no circumstances should boys or girls, or persons who cannot read or write, be permitted to sell poisonous drugs.
5. Some rules are required for the management of a licensed retail trade in poisonous drugs. No youth should be allowed to dispense or sell them who is not above the age of eighteen years, and who has not been for at least one year engaged in the practice of pharmacy, under a Pharmaceutical Chemist or Licentiate of the Apothecaries' Society. This restriction not to be applied to one who has passed an examination either at the Pharmaceutical Society or at Apothecaries' Hall, as to his knowledge of poisonous drugs.
6. That poisonous drugs and medicines having a similar colour and appearance should not be kept near to each other in similar bottles, drawers, or boxes with similar labels.
7. That less facility should be given for the purchase of arsenic, strychnia, and other deadly poisons, which can be used for the purpose of suicide or murder.
8. That no poisonous drugs should be sold to girls or boys under the age of twenty years, on any pretence whatever, and that in all cases of purchase there should be a witness of adult age.
9. All poisonous drugs sold should be distinctly labelled with the name of the drug, the address of the vendor, and the date of sale.
10. That noxious substances, such as arsenic, corrosive sublimate, sugar of lead, and tartar emetic, and others of the like nature, when stored in large quantities in casks or packages, should be distinctly labelled, and kept apart from other substances of an innocent kind which they resemble.

    [Many of the accidents which occur from carelessness in dispensing, and ignorance in administering, medicines, might be prevented by the adoption of Mr. Thonger's patent labels, which are provided with a *sand-paper* border. If these labels were generally employed in shops to mark poisonous drugs, and were used in all cases on bottles containing liquids of a noxious kind, and intended for outward use, there would be a great saving of life, so soon as this simple distinction had become known to the public. The mere feeling of the label, even in the dark, would be sufficient to call attention to the nature of the contents.]

It will be perceived from the reported cases, that the public are at present without any sufficient legal protection against mistakes which are so often fatal. In nearly all cases which are the subject of inquests or trials for manslaughter, it will be observed that proof of *negligence* is not sufficient; the proof must amount to *gross* or *culpable* negligence in law, or the wrongdoer will escape. What gross or culpable negligence is has not yet been defined, but we learn from the verdicts of juries that the keeping of poisons and medicines similar in appearance on the same shelf close to each other is not gross negligence! So the selling of oxalic acid or nitre for Epsom salts, and the keeping of these substances in contiguous drawers or packets, unlabelled until the time of sale, and then labelling the poison as an innocent medicine, does not constitute culpable negligence! The employment of youths of no experience in drugs, who cannot distinguish arsenic from calomel, magnesia, or plaster of Paris,—powdered opium from powdered rhubarb, or laudanum from tincture of rhubarb, furnish,—by the destruction of life, merely illustrations of unavoidable accident or misadventure, and not of gross negligence on the part of an employer! If, however, there be any truth in the proposition *Salus populi suprema lex*, it should apply pre-eminently to cases in which life is exposed to destruction under circumstances in which a person is unable to foresee danger, or to take any precautions against it.

REPORT OF THE MEDICAL OFFICER OF THE PRIVY COUNCIL ON ACCIDENTAL AND CRIMINAL POISONING.

To what extent the administration of poison causes death or disease in England is not even approximatively known. From the Registrar General's last Annual Report it appears that during the four years 1858-61, 1,059 deaths by accidental poisoning, and 509 deaths by voluntary self-poisoning, were returned to him as certified. And during the same four years there were also certified 1380 murders, of which no doubt a considerable, though not ascertained, proportion was due to poison. But evidently it would be erroneous to infer from these figures that poison does not in England prove fatal to more than four to five hundred persons per annum. The list of deaths by poison is at best only the list of the fatal poisonings which are discovered. But here is a cause of death which is peculiarly apt to be undiscovered. For the murderous poisoner of course plans not to be found out. And the accidental poisoner—the careless dispenser, for instance, who supplies a poison instead of an innocent medicine—is at first unaware of his mistake, and may perhaps never be made aware of it. Further, as regards the victim himself,—poisons which make no decided impression on the mouth or palate may be swallowed quite unconsciously of harm, and their effects may then be confounded with symptoms of ordinary disease. And thus, in various ways, whether the administration of poison have been accidental or felonious, the essential circumstances of the case may easily be such that suspicion is not aroused as to the real cause of the illness.

Both with reference to the number of cases in which poison is recognized to be the cause of death, and with reference to the doubt whether perhaps many other deaths are, without discovery, caused by poison, my Lords have deemed it important to consider what security the public enjoys against an indefinite multiplication of such cases. And in order to the consideration of this question, I, under their Lordships' orders, requested Dr. Taylor to report, from his large experience, what, in his judgment, is the present degree of the insecurity, viz. (1) to what extent is injury occasioned by the carelessness and incompetence of persons employed in retailing drugs; and (2) to what extent are unnecessary facilities given for the purchase of poison for criminal purposes.

Dr. Taylor's report points in both respects to a most unsatisfactory state of things.

First, as regards the facility with which poison may be obtained for criminal purposes, Dr. Taylor sums up the case by stating that "so long as a person of any age has the command of threepence, he can procure for this sum a sufficient quantity of one of the most deadly poisons to destroy the lives of two adults . . . No one wishing to destroy another by poison, and having the knowledge to make a selection among drugs, can meet with any difficulty in carrying out his design. If refused at one shop, he can procure the poison at another If refused by a druggist, he can procure it at a grocer's. If refused at a grocer's, he can procure it at a village general shop, where poisons are retailed by girls and boys, and no questions are asked. . . . In the course of more than thirty years' experience in investigating charges of poisoning, I have met with a large number of cases in which murder and suicide have been perpetrated or attempted, as a result of the dangerous facilities which exist for the purchase of poisons."

One particular poison has indeed been the subject of legislation. Under 14th and 15th Vict. cap. 13, arsenic (in quantity under 10 lb.) ought not to be sold otherwise than coloured with soot or indigo,—nor except with full registration of the buyer's name and residence, and of the time, quantity, and professed purpose of his buying,—nor even thus to any person unknown to the seller, unless it be in presence of a witness known to both buyer and seller. But, says Dr. Taylor, "in several cases of criminal poisoning (two occurring in 1863) which I have been required to investigate, involving charges of murder, uncoloured or white arsenic has been used as the instrument of death. Its great cheapness (one penny to twopence per ounce) places it within the reach of the poorest person. It is sold to any applicant on the most frivolous pretences; and even in the coloured state it affords but little protection, except when it is mixed with liquids. The better class of druggists do not sell arsenic by retail; the grocer, chandler, oilman, and village shopkeeper are the principal vendors of this poison; and it is clear from the numerous deaths which take place from white arsenic that they set the law at defiance, and sell the poison in an uncoloured state, in which case it may be readily administered in any article of food, without exciting suspicion."

With the sale of other poisons there is not even nominal statutory interference. And whether they are wanted for murder, or for suicide, or for the procuring of abortion, the facilities are such as Dr. Taylor describes;—for though doubtless druggists of the best class are extremely chary of selling poisons, yet, says Dr. Taylor, "the lower class of drug-dealers, including grocers, oilmen, and the general shopkeepers of villages, have no such scruples; and although, if we except strychnia, many of the more potent poisons are not found in their shops, they have still a sufficient number of noxious drugs to endanger health and life, by reason of the facility with which they dispose of them to the public."

Secondly, as regards the ordinary business of retail druggists in dispensing and vending medicines, Dr. Taylor testifies to the frequent employment of entirely unskilled and heedless persons in this business, and to the mischief which results from the incompetence or slovenliness of such persons;—how "a large number of persons wholly unacquainted with the properties of powerful drugs and medicines are allowed to retail them to the public, on demand, without any check or control;—how "persons who have had no professional education as druggists, and acting as oilmen, grocers, or village shopkeepers, keep for sale laudanum, tincture of rhubarb, senna, black draughts, etc. and either from carelessness in placing the bottles containing these medicines near to each other, or from ignorance, supply laudanum for the tinctures above mentioned, and thus either injure health or destroy life;"—how, for instance, opium and its tincture have often been given in mistake for rhubarb and its tincture,—how oxalic acid and other poisons have again and again been given for Epsom salts,—how chloride of zinc has on several occasions been given for fluid magnesia,—how arsenic has been given instead of calomel and instead of magnesia,—and so forth. In part-explanation of these lamentable accidents, Dr. Taylor points out that the natural results of incompetence and gross ignorance on the part of those who are allowed to retail drugs to the public "are increased a hundredfold by reason of the carelessness displayed in keeping innocent medicines and poisonous compounds resembling each other on shelves or drawers in close proximity." Thus, in the shops of ordinary druggists, tincture of opium, and tincture of senna, and tincture of rhubarb, like one another in colour, may be standing side by side on a shelf, in bottles of like size and shape, and with labels which, if only half-read, seem identical. Or strychnine may be side by side with jalapine, morphia, salicine, quinine;—and "cases have come to my knowledge," says Dr. Taylor, "where strychnine has thus been dispensed by mistake, and has caused death." But the greatest dimensions of this particular danger,—dimensions, in fact, which are almost incredible,—are reached in the general shops of country villages, where draperies, and groceries, and drugs, and poisons are all sold, and where perhaps even foods and poisons are not kept well asunder. From shops of this description (in cases which Dr. Taylor quotes from among various instances known to him) arrowroot, rice, oatmeal, or something else in common demand, has reached its purchaser with a fatal admixture of arsenic. And in one such case (where arsenic had been given instead of arrowroot, and had, of course, killed the consumer) a witness who "went to the shop after the accident to make inquiries, found rice, corrosive sublimate, jalap, and oxalic acid in different papers in the same drawer, and all under the care of an ignorant boy."

And, beyond the limits of the petty village shopkeeping, the careless custody of poisons leads sometimes to their being sold for other matters, and used, even on a larger scale, accordingly: orpiment (arsenical yellow) sold instead of the milder poison of chrome yellow, or instead of turmeric, or instead of mustard, and used as turmeric, to colour buns,—or 12 lb. of white arsenic sold instead of 12 lb. of plaster of Paris, and used in this supposed capacity to adulterate lozenges,—or 30 lb. of sugar of lead sent (perhaps instead of alum) to a miller's, and used for admixture with eighty sacks of flour. Dr. Taylor gives cases where occurrences such as these have led to wholesale poisoning; the Bradford case, for instance, where arsenical lozenges killed seventeen persons, and severely injured 183 others; and the Stourbridge case, where, some years since, under the circumstances I have just described, no fewer than 500 persons were more or less affected (none fatally, but some with great severity) by the poisoning of their bread with lead. And in illustration, not necessarily of the mistaken sale, but assuredly of the most wanton and reckless use of a poison, he describes how, seven years ago, the 340 children of the Norwood school took with their morning milk and water about one grain of arsenic each, and suffered, of course, sharp symptoms of arsenical poisoning, in consequence of a workman's having left in the boiler, which he was employed to clean, as much arsenite of soda as contained about nine pounds of arsenic. "Fortunately (and this accident saved 340 lives) only four gallons of the poisoned water were drawn from the boiler on the following morning. Each child had taken a quantity just within the fatal dose of arsenic."

I venture to submit that the above-described state of things deserves the particular consideration of Parliament. For the unrestrictedness with which at present the retail trade in drugs and poisons is conducted, confers, in a curious way and to an extent which could scarcely have been foreseen, irresponsibility even for mischievous acts. Apparently the view which the Legislature has taken of the matter has been, that the trade might safely be left unshackled by special regulations, and open without special licence to all who chose to undertake its practice; for that the common law would suffice to protect the public by punishing any druggist who by his own incompetence or carelessness, or by the employment of an incompetent or careless agent, should have caused any personal harm. But the view taken by the administrators of the law has not corresponded with that supposed view of the legislature, and the absence of special enactment on the subject seems in most instances to be accepted as a ground for concluding that a druggist's carelessness and malpractice, however extreme in degree, and however fatal in result, are not in the eye of the law criminal carelessness and malpractice. Thus, in nearly all the scandalous cases which Dr. Taylor describes, the tradesman whose ill-conducted business led to loss or endangerment of life escaped with absolute impunity. "In nearly all cases which are the subject of inquests or trials for manslaughter, it will be observed that proof of *negligence* is not sufficient; the proof must amount to *gross* or *culpable* negligence in law, or the wrongdoer will escape. What gross or culpable negligence is has not yet been defined, but we learn from the verdicts of juries that the keeping of poisons and medicines similar in appearance on the same shelf close to each other is not gross negligence! So the selling of oxalic acid or nitre for Epsom salts, and the keeping of these substances in contiguous drawers or packets, unlabelled until the time of sale, and then labelling the poison as an innocent medicine, does not constitute culpable negligence! The employment of youths of no experience in drugs, who cannot distinguish arsenic from calomel, magnesia, or plaster of Paris, or powdered opium from powdered rhubarb, or laudanum from tincture of rhubarb,—furnish, by the destruction of life, merely illustrations of unavoidable accident or misadventure, and not of gross negligence on the part of an employer!" Even in the Bradford case, where in 1858–9, 200 persons were poisoned, and seventeen of them fatally, through the sale of arsenic for plaster of Paris, it was ruled that no legal carelessness had been committed,—no legal carelessness, though arsenic and plaster of Paris were kept in similar casks side by side, in a loft, with no evident label upon either of them,—no legal carelessness, though a boy who had but three weeks' experience in the shop was sent to choose between these imperfectly distinguished casks,—no legal carelessness, though the stuff which he brought down was given without the master's examination to the man who was waiting to make it into lozenges. Evidently this state of things implies more than the Legislature can mean to sanction; it implies not merely that the right-doing druggist shall be free from interference, but that the wrong-doing druggist shall be almost secure from punishment.

Dr. Taylor concludes his report with suggestions which deserve to have much weight, as to the reforms which are desirable in the conduct of pharmaceutical business. His fundamental opinion, that poisons, and medicines likely to act as poisons, ought not to be sold in retail except by properly educated persons, and under some other reasonable restrictions as regards both seller and purchaser, is an opinion which I submit for consideration, as one in which I entirely concur. And it seems to me that this object might be attained without giving the drug trade any reasonable ground of complaint, and without inconveniencing the public as regards the purchasability of non-poisonous drugs. Facilities might be given to druggists to divide themselves into an upper and a lower class. At first such a division might be made by an enactment constituting into an upper class all who had previously passed an examination as Pharmaceutical Chemists or as apothecaries; perhaps with the further addition of all who at the time of the making of the enactment should be in *bonâ fide* practice as druggists on their own account, provided their trade as druggists were conducted separately from all other trade; and, subsequently to the first constitution of this upper class, admission into it might be obtained on examination before some appointed authority or authorities. To persons of this class (but with express exclusion of general shopkeepers) the office of selling poisons might be restricted. And the purchasability of poisons by the public might at the same time be made effectually subject to the rule which now ineffectually relates to the purchase of arsenic;—that no such sale shall be made except with full registration of the buyer's name and residence, and of the time, quantity, and proposed purpose of his buying; nor, even thus, to any person unknown to the seller, unless in presence of a witness acquainted with both seller and buyer. But whether or not provisions like these may seem to the Legislature fit and proper for enactment, I must submit that, with or without such enactments, one particular act of legislation is urgently wanted in the matter; an act, namely, which, either by its own language, or by empowering some department of the Government to make regulations in the matter, shall directly or indirectly provide for the establishment of a legal criterion as to what is *culpable carelessness* in the sale of drugs and poisons, and shall thus render every such carelessness an offence punishable at law.

Before closing this section of my report, I beg leave to bring under particular notice, as connected with the present subject—first, the statements which, in relation to manufacturing towns,* I submitted two years ago concerning the destructive practice of drugging infants with opium, and, secondly, the statements which are contained in Dr. Hunter's appended report (No. 14, already adverted to) concerning the use of opium in our principal marsh districts. "There can (says Dr. Hunter) be no doubt of the truth of the horrid statement made by almost every surgeon in the marsh land, that there was not a labourer's house in which the bottle of opiate was not to be seen, and not a child but who got it in some form. In other countries, where women work away from home, as in the factory towns, the children are drugged by the nurses, and one need not be surprised to find the same plan adopted here; but other circumstances combine to render it a common practice to push this drugging system to an extent known only in the districts in question. The painful rheumatisms and neuralgia which still continue to be common in the Fens [*i.e.* among elder persons, but probably without any suspicion that the infants suffer from them] have been generally treated by the free use of opium, and with this drug the whole people have become thoroughly familiar. The wholesale druggists report that they send immense quantities to these countries, and the retail druggists often dispense so much as 200 lbs. a year.† It is sold in pills or penny sticks, and a well-accus-

* Fourth Report; pp. 32–35, and App. IV.

† Dr. Thudichum gives me the following curious information as to the quantity of opium annually sold at one country town in Lincolnshire:—"Seven druggists in the town of Spalding sell 27 stone $3\frac{1}{2}$ lb. of opium, partly in the form of laudanum. There are 21,000 souls in the town and district of Spalding (last Census) supplied by these druggists. This gives a consumption of opium of 127 grains per head per annum. A small portion of the opium is used for sheep during lambing season. Allowing the 27 grains of every 127 to cover that purpose, which is probably an excessive estimate, there remains the startling circumstance that the consumption of opium in the Spalding district amounts to about 100 grains per individual of the population per annum. The opium is used for eating by adults,

tomed shop will serve 300 or 400 customers with the article on a Saturday night. The druggists thought their largest customers were not the villagers, or people of the little town in which the shop was, but rather the inhabitants of small hamlets or isolated farms in the Fens. Opium is often asked for under some cant name, and the idea of it is as of a forbidden jollity. The quantity which an old opium-eater will take has often been reported (about half an ounce a day is common) and finds its limit rather in the cost than in the strength of the drug. A man in South Lincolnshire complained that his wife had spent £100 in opium since he married. A man may be seen occasionally asleep in a field leaning on his hoe. He starts when approached, and works vigorously for a while. A man who is setting about a hard job takes his pill as a preliminary, and many never take their beer without dropping a piece of opium into it. To meet the popular taste, but to the extreme inconvenience of strangers, narcotic agents are put into the beer by the brewers or sellers. Half a century ago the growth of poppies for the London drug market was conducted in this light land. Then the husbandman took poppy drink with him to the field; and now, although the cultivation of the article for sale is almost abandoned, the poppy capsule forms the principal ingredient of the herb teas and domestic medicines of the neighbourhood. With such familiarity with the drug, no wonder that every one is ready to use it to quiet a crying child, though only to ensure its crying again as soon as awake. Opium eaters are said to be always proselytizers, and will even give a child opium behind the back of the mother or nurse. The favourite form for infants is called Godfrey's Cordial, a mixture of opium, treacle, and infusion of sassafras. This is thickish, and is often fetched in a teacup. When the mother going to field-work deposits her child with a nurse, she thinks it best to leave her own bottle of Godfrey, because the preparations of the different shops vary, and there is not a little village shop in the country that sells anything that does not sell its own Godfrey. To push the sale of opiates in these little shops is the great aim of some enterprising wholesale merchants. By druggists it is considered 'the leading article,' and the profit on it is small when sold in a crude state. It has not unfrequently happened that a nurse has substituted her own Godfrey for her client's, and, frightened at its effects, has summoned the surgeon, who finds half-a-dozen babies, some snoring, some squinting, all pallid and eye-sunken, lying about the room, all poisoned."

PHARMACEUTICAL RESPONSIBILITY.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—A correspondent in the last number of your Journal suggests that the sympathy of the Pharmaceutical profession should be expressed by a subscription to pay the damages and costs which we have lately incurred. A similar wish has been expressed privately by several friends, and one gentleman, prompt in the exercise of generous feelings, has sent us a post-office order. A correspondent of 'The Chemist and Druggist' has advocated the same course, and announced several subscriptions for the purpose.

We appreciate very highly the sympathy of our brethren, and return our best thanks to those who have come forward spontaneously and generously to alleviate our misfortune; but we take the earliest opportunity of requesting that you will be good enough to allow us to inform your readers that we do not desire, and should respectfully decline to accept, such an expression of their sympathy, welcome as that sympathy is. Heavy, and as we believe undeserved, as is the penalty that we have had to pay for the act or supposed act of another, we are thankful that we are able to bear it.

We do however hope that the Council of the Pharmaceutical Society will take steps to obtain an alteration of the law, and we may take this opportunity

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and for drugging infants. Infant mortality in that district is 21,845, while in all England it was 17,731 out of 100,000 living. The population of Spalding had decreased during the last ten years. The quantity of opium does not include the opium used by the medical practitioners. The data regarding the quantities of opium sold at Spalding have been collected by Dr. E. Morris, of Spalding, and communicated to me."

of mentioning an interpretation of the law which was not afforded to us until near the termination of the proceedings in which we were involved.

We had been led to suppose that the word "may" preceding the words "give such compensation" in the second clause of Lord Campbell's Act, quoted by you at page 94 of your last number, was intended to give the jury a discretionary power, and enable them to take into consideration the blameworthiness of the employer whose servant might have accidentally caused death. But our counsel, Mr. Stephen Temple, Q.C., and Mr. J. R. Quain, advised us otherwise, —that, in the connection in which it is used, the word "may" is equivalent to *shall*, and that whether the death was occasioned wholly by the act of our servant, wholly by our own act, or partly by one and partly by the other, was immaterial in assessing the amount of the damages.

Under this interpretation of the law, it is evident that the richest member of the profession is liable to total ruin for acts which he can neither foresee nor prevent. We do not believe that any intelligent person who may consider the operation of such a law can believe that it is reasonable. We should be content with such an alteration as would convert the compensation into a fine proportioned to the blameworthiness of the parties.

We were informed that the deceased had insured his life for £1000, and we were advised that this sum, diminishing the loss to his family, was a set-off in our favour.

We crave also to put on record that the strychnia was in an opaque bottle, of which there were only fourteen in the shop, which were placed separate from the dispensing counter and from the bottles in ordinary demand, and that it was not near the Dover's Powder.

We are, your obedient servants,

CLAY AND ABRAHAM.

Liverpool, 24th September, 1864.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—It was with much pleasure that I perused your able and equitably written article in the present number of the Pharmaceutical Journal on the above subject, and a few of the remarks you make therein induce me to take the liberty of intruding myself on your notice, to offer briefly a suggestion or two relative to the subject of which you treat.

You make the inquiry, "Now does it not behove us to consider how we can best turn this occurrence"—the late decision in the case of Messrs. Clay and Abraham, of Liverpool—"to account in providing for the future?" and further on, "May there not be something done to relieve the individual who stands legally responsible for a fatal accident, when the most approved precautions have been adopted, from the infliction of an unmerited, although it may be not an unjust penalty?"

I fully agree with you that the knowledge that at any time his business may be shattered, and himself ruined, through the inadvertence or momentary carelessness of even a trustworthy and efficient assistant, however well that business is habitually carried on, may well cause "painful reflections" in the mind of any thoughtful man; but while reading your remarks, I could not help thinking that such anxiety might be removed in a very simple manner.

Let a fund be established bearing the title of "The Chemists' and Druggists' Guarantee Fund," the object of which would be to defray the fine imposed upon any subscriber to it who might have such fine imposed upon him in consequence of medicine of a poisonous nature having been by mistake supplied at his establishment, and death resulting to the person taking that medicine.

As the net income of many chemists does not exceed a hundred and fifty or two hundred pounds a year, I would suggest that the annual sum to be contributed by each subscriber to entitle him to receive the benefit arising from the fund should not of necessity exceed half-a-guinea; but, nevertheless, it might be intimated that an additional half-a-guinea would be gladly received from those who, in advanced and more prosperous circumstances than the majority of their brethren in the trade, are well able to contribute that amount.

It would be expedient to make a regulation that no fine should be defrayed by the society except in cases where it was clearly and publicly proved that the accident causing such fine to be inflicted was wholly unavoidable on the part of the proprietor of the business, and that all desirable precautions had been taken by him to prevent any such occurrence; and, in addition, that the amount of *the fine only, and not the costs of defending the action*, should be defrayed by the society, except in cases where the amount contributed had exceeded the stipulated sum of one half-guinea.

To illustrate the method I suggest, let us suppose a fund to have been established two years since, and that immediately on its formation four thousand chemists and druggists had become contributors, of whom three-fourths subscribed half-a-guinea, the remaining fourth one guinea; let us suppose that at the end of the first year an additional one thousand members had been enrolled, of whom eight hundred had contributed half-a-guinea, the remaining two hundred one guinea; had this been the case, at the present time, two years after the establishment of the fund, there would be in the hands of the treasurer the sum of five thousand eight hundred and eighty pounds, less the current expenses. Now, out of such an amount as that, the fine lately imposed at Liverpool could easily be paid, together with the costs of the action, and a considerable sum still remain for future contingencies.

I think that, were these or similar measures adopted, the minds of many conscientious and careful chemists would be relieved of a great and pressing anxiety, while the expense would not be such as to make the tax burdensome; and an association formed on these principles might eventually prove the means of rescuing from bankruptcy and ruin those whose constant endeavours were to perform their duties to the public, their families, and themselves in a right and high-principled manner, but who nevertheless from quite unavoidable circumstances, except for such guarantee, would be subject to overwhelming losses.

I beg leave to apologize for thus trespassing on your time and attention, but hope that should you deem my communication worthy of appearing in the pages of the Pharmaceutical Journal, it might lead its readers to give the method I have suggested their thoughtful consideration, after which it could be adopted or abandoned, as was thought best.

I have the honour to be, Sir, your obedient servant,

J. C.

September, 1864.

POISON CLOSETS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Among the numerous precautions against accidental poisoning, the most favoured scheme at present seems to be the poison closet; now it is very easy to make your closet, but when made, then comes the question, what are you to put into it? and here lies the difficulty. If too many things are put in, the effect of the special caution is lost; if not enough, and a fatal accident should occur with one of the excluded bottles, a jury would most probably pass a more severe condemnation on the master in consequence of his keeping that particular article among harmless drugs, when he had a special place for poisons. Would it not be valuable to have a list of those articles that should, in the opinion of those most competent to judge, be kept apart as especially dangerous, so that some uniformity may be observed by those pharmaceutists who adopt this plan? About strychnia, morphia, hydrocyanic acid, Tinct. Opii, and many others, there can of course arise no question, but with Liq. Plumbi, Pulv. Ipecac. Co., Ext. Belladonnæ cum Opio, the strong acids, etc., there might be a doubt as to where they ought to be placed. Again, certain chemicals having very distinctive characters, such as Hyd. Iodid. Rub., Plumbi Iodid., Hyd. Oxyd. Rub., Cupri Sulph., would be as safe out of the closet as in it.

Another question that might be considered is, should the closet only contain the bottles used for dispensing and retail, or should the stock of such articles be kept there also? My own opinion at present is in favour of a very restricted list, but I should like to hear what others in the trade think advisable.

I remain, yours faithfully,

Ipswich, Sept. 23, 1864. H. CHAPMAN.

THE SUPPLY OF COD-LIVER OIL.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The following practical information relating to the supply of cod-liver oil, has been given to me by the captain of a ship, who has been engaged for many years in the Newfoundland trade.

Yours very obediently,

Gracechurch Street, Sept. 15, 1864. ROBERT HOWDEN.

Cod fishing begins in Newfoundland on or about the 20th day of June, and ends on the last day of October.

The capeling (a small fish) strike in about June 20th, in great numbers, the codfish follow preying upon them.

The fishermen use these capeling as bait from the 20th of June to the end of July, but after that time, to the 10th of August, the codfish have become so glutted with capeling that they will bite no more: when the bait is lowered among them, they can be seen to swim away from it.

Squids and herrings strike in about the last week in August, and are closely followed by other codfish preying upon them. These that follow the squids and herrings are much finer, heavier, and fatter fish than those that follow the capeling.

The capeling are very lively and agile fish, and so are the cod that pursue them, their movements are swift, and they both swim near the surface of the water; but the squids and heavy codfish are only found near the bottom. The lines for the latter have to be heavily leaded.

The livers taken in October are much finer than those taken earlier, but the weather in October is rough, and often so violent as to render fishing impossible.

Therefore the cod-liver oil made in the beginning of the season is the most certain supply, and it may happen in some years to be the only one; but that made later, though not so sure, is superior in quality.

A NEW INDIAN VERMIFUGE.

Mr. G. H. K. Thwaites, Director of the Royal Botanical Garden of Peradenia, Ceylon, thus writes in a recent letter to Mr. D. Hanbury, London :

"There is a species of *Erythroxylon* here, *Sethia indica*, DC., which is in great repute as a vermifuge for children. The leaves are dried and pounded, and given to the child with boiled rice. *Sethia acuminata* Arn. is also given for the same purpose in the same way. Would it be worth while sending you some of the dried leaves for analysis? any quantity could be procured in the low country near the sea. It goes here under the name of *Matura Worm Medicine*."

BOOKS RECEIVED.

The Laboratory Guide for Students of Agricultural Chemistry. Arranged by Arthur Herbert Church, M.A., etc. London: John Van Voorst, Paternoster Row. 1864.

First Outlines of a Dictionary of the Solubilities of Chemical Substances. By Frank H. Storer. One volume in three parts. Part III. Cambridge: Sever and Francis. 1864.

Cooley's Cyclopædia of Practical Receipts, Processes, and Collateral Information in the Arts, Manufactures, Professions, and Trades; including Medicine, Pharmacy, and Domestic Economy. Designed as a comprehensive supplement to the Pharmacopœias, and general book of reference for the manufacturer, tradesman, amateur, and heads of families. Fourth edition, revised and enlarged. By Arnold J. Cooley and J. C. Brough. 8vo. Pp. 1393. London: John Churchill and Sons, New Burlington Street. 1864.

TO CORRESPONDENTS.

Rad. Senegæ (Glasgow).—(1.) The Regulations will be forwarded on application by letter to the Secretary, 17, Bloomsbury Square. (2.) *Pepsine Wine*, vol. xviii. p. 197. —Pepsine ʒiss, Distilled Water ʒvi, White Wine (of Lunel) ʒxv, White Sugar ℥i, Spirit of Wine ʒiii: mix, until the Sugar is quite dissolved, and filter. (3.) *Syrupus Ferri, Strychniæ, et Quiniæ Citratis.*—We are not acquainted with the formula for this syrup.

We have received a communication from "A Member," in reference to some remarks by Professor Balfour on "Botanical Science and the Bible," in our last number. Our correspondent thinks that the discussion of such subjects is not appropriate for the pages of a scientific journal.

The Liverpool Poisoning Case.—Communications have been received, suggesting that a subscription should be raised for the purpose of reimbursing the firm, but it will be seen, in another part of this Journal, that Messrs. Clay and Abraham respectfully decline this proposal.

A Member (Gloucester) wishes for a recipe for a red and black enamel for filling in inscriptions on tombstones, etc.

Tymm (Mexboro').—(1.) Berg, 'Pharmazentische Waarenkunde,' Berlin, 1863; Régnault, 'Premiers Éléments de Chimie,' 5 francs. (2.) Wiggers, 'Handbuch der Pharmacognosie,' Göttingen, 1864. (3.) Régnault, 'Cours Élémentaire de Chimie,' 20 francs. (4.) We must see the books before we can compare them.

Erratum.—Page 97, line 18, *for* 21st of October *read* 26th of October.

Instructions from Members and Associates respecting the transmission of the Journal before the 25th of the month, to Elias Bremridge, Secretary, 17, Bloomsbury Square, W.C.

Advertisements (not later than the 23rd) to Messrs. Churchill, New Burlington Street. Other communications to the Editors, 17, Bloomsbury Square.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VI.—No. V.—NOVEMBER 1st, 1864.

ON THE DUTIES AND RESPONSIBILITIES OF THE CHEMIST IN DISPENSING MEDICINES.

A case of attempted criminal abortion which recently occurred at Brighton has raised some questions relating to the duties of dispensing chemists, to which it is right to direct the attention of our readers. It appears that a young unmarried woman, a "lodging-house keeper," obtained from a medical man a prescription ordering two ounces of tincture of ergot and two drachms of oil of pennyroyal, of which a teaspoonful was directed to be taken three times a day in water. This prescription was written in the usual medical form, and signed with the initials of the prescriber. It had been made up at various times by at least two different chemists in Brighton during the last four years, but latterly several bottles of the medicine were obtained within a comparatively short time from the chemist with whom the patient usually dealt; and the patient having died while taking the medicine, an inquest was held, and, after a full investigation of the circumstances of the case, in which it was proved that the deceased was four months gone in the family way, a verdict of *felo de se* was returned. This verdict was accompanied by a statement from the jury that "they thought greater precaution should be used by chemists in dispensing such deleterious medicines." A report of the proceedings at the inquest will be found in another part of this Journal. No one, after reading that report, can doubt, we presume, that the patient took the medicine with a criminal object, namely, that of producing abortion, and that the result of persisting in its use was the destruction of her own life. The questions to be considered by medical men and pharmaceutists are these:—Was the medical man justified, under the circumstances, in ordering such a medicine, and was the chemist justified in dispensing it? Of course, we assume here that the medicine was originally prescribed for some other object than that for which it appears to have been frequently taken. The writer of the prescription alleges that the medicine was ordered for a bronchial affection, but this will hardly be credited. We do not, however, propose to discuss here the conduct of the prescriber so much as that of the dispensers of the medicine; and we are the more induced to notice the subject in consequence of some remarks made upon it in the 'Medical Times and Gazette' for October 15th. The editor, in a leading article on the subject, calls the "attention of the Pharmaceutical Society to the following particulars:"—1st. The custom of prescribing, *per se*. 2ndly. The fact that strong medicines, such as *Linum catharticum*, were prescribed for a woman of twenty-six, whose catamenia had ceased six weeks. 3rdly. That one of the witnesses, Mr, Stowell, not only undertook to prescribe, but alluded to some superior knowledge he possessed, stating, "*we have better medicine to produce the desired results.*" 4thly. That, spite of the habit of prescribing, respectable chemists, in giving evidence in this case, profess to be ignorant of the only purpose to which a compound of ergot and pennyroyal, in such doses, could be applied by a woman. He proceeds to say:—"We desire to hear the Pharmaceutical opinion of this case, officially; and meanwhile say: Take your line and keep to it. If you are to prescribe, please to study medicine, so that there may be no chance of giving *Linum catharticum* to pregnant women. But it will not do, both to prescribe and then to pretend that you are mere ministers who will sell whatever you are asked for, and that even though you supply a woman with means of abortion, you are to be considered innocent of all complicity."

Now, three out of the four charges here made, and so pointedly urged, are disposed of by the simple statement, of which evidence will be found elsewhere in the present number of this Journal, that none of the chemists who gave evidence or were in any way implicated in the case, prescribed either *Linum catharticum* or anything else to the deceased. The editor of the 'Medical Times' has evidently fallen into an error in supposing that Mr. Stowell was a chemist and druggist, whereas he is a member of the College of Surgeons of London, and has also an M.D. diploma. How this mistake could have been made we cannot conceive, for in the accounts we have seen in the newspapers he is represented as a medical practitioner. In one of his circulars now before us he speaks of having studied medicine at St. Bartholomew's Hospital, so that in this case at least the study of medicine does not appear to have prevented the chance of *Linum catharticum* being given to pregnant women, for it was he who gave it. We would ask any candid peruser of the evidence in this case whether there is anything in it to justify the editor of a medical journal in passing over almost without comment the practices of members of his own profession, while he severely criticizes the conduct of the chemists who dispensed the medicine or gave evidence at the inquest. There is only one ground upon which any exception could possibly be taken to the conduct of the chemists in this case, and that is that they are expected to exercise a judicious control over the unsafe administration of medicine. The question might certainly be raised whether such control was exercised throughout in this case. We do not wish to exonerate those who undertake the duty of dispensing medicines from such responsibility. We have often referred to the importance of such a control being exercised to show the necessity for the acquirement of a considerable amount of professional knowledge by Pharmaceutical Chemists. Although we have reason to complain of much disingenuous criticism, on this and other occasions, we are glad to see some evidence of a new light breaking in upon the vision of our contemporary. We gather from the purport of his remarks above quoted that the dispenser of medicines is expected to know something more than the mere mechanical operations of correctly mixing and labelling what the physician orders. This is a great step in advance of what he stated a few months ago. In February last we were told by him that "*any intelligent neat-handed lad or woman of ordinary education can be taught to dispense accurately and well in three months.*" And further, we were told, "Of this the chemist may be certain, that if any one is killed by the prescription of a physician, the penalty of the law will certainly not fall on the dispenser, if his duty be accurately performed, but on the prescriber." Again he says, March 5th, "We hold that dispensers of medicine should possess competent knowledge of *dispensing*, (*sic*) just as other tradesmen should be acquainted with their several callings." "To become an expert dispenser of medicines, it is only necessary that a lad should have an ordinary education at a third-class grammar school, and an apprenticeship to a competent master for a moderate length of time." Now surely, if the duties of dispensers of medicine were correctly represented by the editor of the 'Medical Times' in last February and March, they were not improperly performed by the chemists who dispensed Dr. Rymer's prescription at Brighton. There is not the slightest imputation of any want of accuracy in dispensing the medicine.

But we never have contended or admitted that the duty and responsibility of the dispenser are limited to the strict and accurate fulfilment of the written instructions of the prescriber. We contend that the dispenser ought to possess a knowledge of the probable effects of the medicines he dispenses, and to exercise this knowledge with discrimination and judgment for the prevention of injury to the public. This is a part of the duties of the pharmaceutist that is not acquired in three months or in three years,—which is altogether independent of a competent knowledge of *dispensing*, and involves a considerable amount of professional acquirement. The interference of the dispenser in refusing to supply a medicine ordered by a physician's prescription is a duty which sometimes occurs, and when it does occur it requires the exercise of much judgment and some amount of medical knowledge. It seems to have been implied in the case under notice that the chemists ought not to have supplied the medicine, but in this we do not agree. Such medicines are not unfrequently ordered in medical practice. A reference to Pereira's 'Materia Medica' will show that the medicine prescribed in this case may be used for many legitimate purposes, some of which would involve a lengthened continuance of its use, yet the patient would naturally be averse to any inquiry being made by a dispenser as to the object for which it was administered. Even if circumstances, other than the mere nature of the medicine, should cause suspicions to be entertained, the task of objecting in such a case to dispense a physician's prescription for a known customer would be a delicate and difficult one, which few would like to undertake. It must be borne in mind, with reference to the conduct of the chemist who latterly supplied several bottles of the medicine, that the prescriber had previously called on him and told him he was ordering such a medicine for the patient. Could he, under such circumstances, and especially if he had refreshed his knowledge of the therapeutic uses of ergot by a reference to Pereira, decline to supply the required dose without some more specific ground of objection than that of its possible application for an unlawful purpose? A further and sufficient ground of objection was afterwards afforded him, and then he refused to supply any more.

Under all the circumstances of the case, we have no hesitation in saying that we had rather represent the pharmaceutical than the medical agents in this affair.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, 5*th October*, 1864,

Present—Messrs. Bird, Bottle, Davenport, Deane, Hanbury, Haselden, Hills, Morson, Orridge, Sandford, Savage, Squire, Standring, and Waugh,

The following were elected

MEMBERS.

Charles Umney ....London.
James Faulkner..London.

The death of Mr. Thomas Herring, of 40, Aldersgate Street, having been announced, a letter of condolence was ordered to be sent to the family of the deceased gentleman.

Resolved—That Mr. William Manning Watts, of 32, Whitecross Street, be appointed to fill the vacancy in the Council occasioned by the death of Mr. Herring.

EXAMINATION, *October* 19*th*, 1864.

MAJOR (Registered as a Pharmaceutical Chemist).

Eminson, John Milton Oxley ....Gainsborough.

MINOR (Registered as Assistants).

Daggers, Frederick..Preston.
Hill, Henry..Kendal.
Lacey, Richard ....Norwich.
Mansell, Thomas ....East Retford.
Rastrick, Robert Joseph..Southsea.
Rickards, Edwin ....Ludlow.
Smith, John .... Derby.

REGISTERED APPRENTICES.

Name.	Residing with	Address.
Ball, George Stephen	Mr. Merryweather	Leicester.
Beedzler, John	Messrs. Sturton and Co.	Peterborough.
Blanchflower, John Coleman	Mr. Blanchflower	Yarmouth.
Corner, Robert	Mr. Corner	West Hartlepool.
Dax, Henry John	Mr. Saunders	Oswestry.
Hart, James	Mr. Williams	Manchester.
Haydon, Frederick William	Mr. Groves	Blandford.
Houghton, Henry Thomas	Mr. Shone	London.
James, David	Mr. Evans	Cardigan.
Matthews, Charles William	Mr. Kingsford	London.
Newman, Joshua Booth	Mr. Hamp	Wolverhampton.
Noakes, Henry Thorby	Mr. Noakes	Brighton.
Padwick, Thomas	Mr. White	Havant.
Pickering, Samuel Whaley	Mr. Higgins	Chester.
Rowell, Robert Henry	Messrs. Proctor and Son	Newcastle-on-Tyne.
Taylor, James	Mr. Andrews	London.
Tunley, John	Mr. Tunley	West Bromwich.
Wilkinson, Joshua Hardisty	Mr. Miller	Blackheath.

EXAMINATION, *October* 26*th*, 1864.

MAJOR (Registered as Pharmaceutical Chemists).

Bailey, John ....London.
Balkwill, Alfred Payne ....Plymouth.
Davies, William ....London.

Gibbans, Thomas Gilks	Manchester.
Fitzhugh, Richard	Nottingham.
Heanley, Marshall	Peterborough.
Hickey, Evan Lewis	London.
Jones, William	London.
Orpe, Thomas Mansell	London.
Sims, Joseph	Hirwain.
Taylor, Thomas	Peckham.
Thomas, Rees	Merthyr.
Upjohn, Henry C.	Oxford.
Young, Robert Fisher	Gringley-on-the-Hill.

PHARMACEUTICAL MEETING.

Wednesday, October 5th, 1864.

MR. SANDFORD, PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting having been read, the following

DONATIONS TO THE LIBRARY AND MUSEUM

were announced, and the thanks of the meeting given to the respective donors thereof:—

The Chemical News.
The Chemist and Druggist.
The British Journal of Dental Science.
The Dental Review.
The Medical Circular.
The Photographic Journal.
The Educational Times.
The Technologist.
The Veterinarian.
The Journal of the Society of Arts.
The Journal of the Chemical Society.
The Canada Lancet.
The Quarterly Journal of Science.
Bulletin de la Société de Chimie de Paris.
Bulletin de la Société Botanique de France.
Watts's Dictionary of Chemistry. Parts XVI. to XX. From the respective Editors.

Proceedings of the Linnean Society. From the Society.

Proceedings of the Annual General Meeting of the Members of University College. From the College.

Index Fungorum Britannicorum.
The Genus Ascobolus. By M. C. Cooke.
Elatine. Solution aqueuse de Goudron de Sapin concentré.
Ueber Pharmako-dynamische Aequivalente für die Hauptbestandtheile der Mineralwässer und über einiges Verwandte.
Die Delondre-Bouchardat'schen China-Rinden.
Ueber die Naturwissenschaften. Von Dr. P. Phoebus.
Commentar zur Preussischen Pharmacopœia. Vierte Lieferung. Von Dr. F. Mohr. From the respective authors.

Parcel of Chinese Medicines. Received through Mr. Frederick Barron.

Case of the Acids and Alkaloids of Opium. From Messrs. Smith, of Edinburgh.

The PRESIDENT said it gave him much pleasure to meet his friends again in that room for the renewal of their evening discussions; he thought these meetings one of the most important features of the institution. There were other occasions on which the business of the association was transacted, but it was in the evening gatherings that they were, in the best sense of the word, *a Society*; they came together to communicate to each other the result of their individual experience,—sometimes to have opinions confirmed, sometimes corrected,—but always, he believed, for mutual advantage. He looked back with satisfaction to the meetings of last session, which had been as well attended and pleasant as any the Society had ever held, and he trusted the coming session would be as successful. When they met last year they were all expectation for the British Pharmacopœia, but now that it had been in their hands for some months there was as much, or more, uncertainty respecting it than before, and he did feel it was desirable that, if possible, this Society should make some effort to remove that uncertainty: he thought many expected a revised edition, but he believed there was no ground for such expectation; another edition would doubtless come in due time, but they might have to wait long for it, and in the meantime there should be uniformity of practice among dispensers. Good or bad, the British Pharmacopœia was their legal authority; and it was a great inconvenience on receiving a prescription from a customer which had been previously prepared elsewhere to feel doubtful whether P.L. or P.B. had been the guide of the former dispenser; in many cases, such for instance as infusion of gentian, the difference would be apparent and, although really immaterial, would shake the confidence of the patient.

The Poison question was attracting great attention just now, and he thought it very probable that some legislative action would be taken on it during the next Session of Parliament; it might be well to introduce some provision on this subject into the new Pharmacy Bill, but that was a matter for grave consideration; it was one of the most difficult questions they had to deal with; there had been a discussion on it in the Conference at Bath, but he could find no satisfactory measures proposed. If poison-closets were established nobody knew where to stop, and between different poisons in the closet there must be great distinctions; still the public, who knew nothing of the practical difficulties of the trade, seemed to demand some action, and it became the Pharmaceutical Society to be prepared. This public desire had been much stimulated by the recent report of Dr. Taylor, and there was one case mentioned therein to which he, the President, must refer. It was one in which it was alleged that four packets of oxalic acid had been sold by a druggist in mistake for Epsom salt, and death had been caused thereby. Now the circumstances corresponded so perfectly with those of an established case of fraud, that the identity of the two seemed almost certain. Epsom salt had been asked for, and was really supplied; but it was proved that the purchaser, whose life had just been heavily insured, had on the same day bought half a pound of oxalic acid, and although the remaining packets labelled Epsom salt contained oxalic acid, they contained also in *the folds of the paper* Epsom salt, and were sealed with wax differing from that used by the druggist. A verdict of *Suicide* was given after a lengthened investigation. Pharmaceutists were liable to such a danger as this amongst others.

The first evening of the session was usually devoted to the distribution of prizes; this must be always a pleasing duty; it was a pleasure to be brought face to face with successful men, indeed success itself made a man interesting, but in this case the success had been achieved in their own institution, and was satisfactory evidence that the system adopted had worked well. The President hoped the reports which he now called on the Professors to give would further prove this.

CHEMISTRY AND PHARMACY.

Professor Redwood then presented his report. He said that after performing a similar duty for twenty years it was difficult to find anything fresh to say. He must report the same good conduct and diligence on the part of the pupils, and with regard to their progress, he must remark that the standard at these examinations had greatly advanced. Much more was expected of the pupils now than used to be expected; the questions given out were more difficult, and the answers generally were better than they were twenty years ago. It was well to take a retrospective view occasionally of the results of their labours in the cause of pharmaceutical education. In doing so he saw no ground for discouragement, but much to induce them to persist in the course they had hitherto adopted. In accounting for diminished attendance in the school, it should be remembered that the Society had now for many years sent out large numbers of qualified instructors, and that candidates came from them ready prepared to pass the examinations of the Society. On the whole, the retrospect afforded him great satisfaction.

The questions and awards were as follows:—

1. What are the respective weights of a pint of each of the following liquids:—Rectified Spirit, Proof Spirit, Chloroform?
2. What is the meaning of the term *Specific heat;* how is the specific heat of bodies determined; and what is the specific heat of Olive Oil as compared with Water?
3. What is meant by the term Dialysis? Describe the method of conducting the process to which this name is applied, and mention some of the results which have been obtained by it.
4. Describe the preparation and properties of Phosphorus and Phosphoric Acid.
5. State the sources from which Bromine is obtained, and describe the method of isolating it, and also its properties and atomic weight.
6. Name the body represented by the formula C_2NH, and describe its properties and tests.
7. Give the atomic formula for Urea; describe the method of producing it artificially, and the nature of the change effected by the application of heat to it.
8. Describe the processes of the British Pharmacopœia for the preparation of *emetic tartar* and *hydrochlorate of morphia.*

Medal ....John Watts.
Certificate of Honour ...John Bingley.
" ...Fredk. R. Pasmore.
Certificate of Merit ......Edward B. Goulden.
" ......John M. O. Eminson.

BOTANY AND MATERIA MEDICA.

Professor Bentley said that he had on the present, as on all previous occasions when he had to make his annual report on the class of Materia Medica and Botany, to speak in the highest terms of the general conduct, diligence, and progress of the students both at the Society and at the Royal Botanic Gardens; in fact, such a statement, if stereotyped, would be always found applicable to pharmaceutical students. Professor Bentley stated that he spoke from an experience founded on sixteen years' active labour as a professor of the Pharmaceutical Society, and hence it could not but prove most gratifying to those gentlemen who had for so many years sacrificed a great part of their time, money, and energies to the promotion of pharmaceutical education; the seed which they had sown had kindly germinated and grown, and was now putting forth its branches and ripening its fruit in all directions. Professor Bentley then announced the result of the Terminal Prize Examination. The competition was a severe one and the result most creditable to all concerned, for those who had gained honours might well be proud of their distinctions, for they eminently deserved them. Professor Bentley, in referring to the successful candidates, said that he felt called upon to allude especially to Mr. Watts, who had carried off all the Sessional Prizes. He could not speak in too glowing terms of such a pupil, and he trusted all future students would look up to him as their model. It was especially gratifying to him to find Mr. Watts in such a distinguished position on the present occasion, as he had at a previous distribution of prizes spoken in very high terms of his acquirements, and had then predicted that Mr. Watts's career would be a very distinguished one.

The questions for the written examination were as follows:—

1. Describe the physical and chemical characteristics of Chlorophyll. State where it is found, the conditions favourable to its development, and the changes which it undergoes at the different seasons of the year.
2. Define the following:—Bulb, Corm, Rhizome, Tuber, and Tubercule. Mention the various substances of the Materia Medica which present illustrations of them respectively, and name the plants which yield them, and the Natural Orders to which they belong.
3. Define the following terms:—parasite, epiphyte, serrate, ligule, cupule, involucre, panicle, hypogynous, syngenesious, isomerous, gynandrous, and tetradynamous.
4. What are the substances required for the support of plant-life; and in what manner are they taken up by plants?
5. Describe the physical and chemical characteristics of both *colchicum corm* and *seeds*, and state the time of the year in which they should be collected for use.
6. Mention the officinal plants of the British Pharmacopœia derived from the Ranunculaceæ. Mention the botanical and geographical sources of *podophyllum rhizome*, and describe its physical and chemical characteristics.
7. Describe the physical characteristics of Croton Seeds; state their botanical and geographical source, the manner in which Croton Oil is obtained, and the differences between East Indian Croton Oil and English Croton Oil.
8. Give the essential characters of the following Natural Orders, and enumerate the officinal plants of the British Pharmacopœia which they respectively contain:—Cruciferæ, Umbelliferæ, Atropaceæ, Polygonaceæ, Iridaceæ, and Melanthaceæ.

VIVA VOCE EXAMINATION.

Besides the above questions, the following plants were submitted to the several competitors, who were required to name them, to state the Natural Orders to which they respectively belonged, to mention their medical and economical properties, and to describe any peculiarity they might present worthy of notice:—

Aconitum Napellus—Delphinium Staphysagria—Hypericum calycinum—Althæa officinalis—Epilobium angustifolium—Ecbalium officinarum—Conium maculatum—Coriandrum sativum—Fœniculum dulce—Æthusa Cynapium—Artemisia Absinthium—Pyrethrum Parthenium—Matricaria Chamomilla—Anthemis nobilis—Inula Helenium—Knautia arvensis—Tanacetum vulgare—Lobelia inflata—Solanum nigrum—Atropa Belladonna—Datura Stramonium—Nicotiana rustica—Hyoscyamus niger—Solanum Dulcamara—Solanum Dulcamara, *var.* alba.—Borago officinalis—Marrubium vulgare—Origanum vulgare—Pentstemon *species*—Lysimachia Nummularia—Gentiana *species*—Mercurialis annua—Lilium *species*—Funkia ovata—Veratrum album.

The medal and certificates were awarded as follows:—

Medal	John Watts.
Certificate of Honour	John Bingley.
,,	F. R. Pasmore.
Certificate of Merit	Alfred R. Hall.
,,	John M. O. Eminson.
,,	Peter W. Squire

PRACTICAL CHEMISTRY.

Dr. Attfield remarked, that although the questions for examination in the class of Practical Chemistry were all of an analytical character, it was not therefore to be supposed that students in the laboratory learnt nothing but analysis,—they learnt synthesis, or the manufacture of chemical substances as well; above all, they learnt the principles and facts on which manufacturers and analysts depend. Students who entered the laboratory, especially those working for short periods, learnt not so much to be accomplished analysts or expert manufacturers, but by means of synthesis and analysis made themselves acquainted with the chemistry of medicinal substances and became familiar with chemical manipulation. To ascertain the synthetical ability of students he carefully noted and recorded during the session the neatness, completeness, and excellence of their work, and the observations influenced, to some extent, the result of their analytical labours on the examination day. He was much gratified with that result on the present occasion. There was a larger number of competitors than the previous year, and with regard to them he would say that even the unsuccessful ones were well pleased with their day's work, one of the latter stating that it had taught him he could do much more analysis in a given time than he believed himself capable of accomplishing. Dr. Attfield was glad that the medal had been obtained by Mr. Watts, who having carried off the first prizes in other subjects, was not open to the suspicion that he had neglected some studies to excel in one. He also had great pleasure in recommending the Council to award a Certificate of Honour to Mr. Smith, whose answers had brought him close to the position of Mr. Watts. The first Certificate of Merit was fully deserved by Mr. Goulden, who had worked at Practical Chemistry under the disadvantage of being engaged at Practical Pharmacy during the evening. Mr. Pasmore, who was a particularly neat operator, had unfortunately suffered from ill-health or would probably have stood higher; and Mr. Bingley had worked during a portion of the session only—his position above some others was the result of unwearied application.

The questions and awards were as follows:—

1. You are furnished with four unlabelled Pharmacopœial preparations; analyse and name them.
2. Examine the specimens of Calomel, Sulphur, Sulphate of Quinine, Hydrochloric Acid, and Chloroform, supplied to you, and report on their quality.
3. The solutions marked A and B may contain any of the ordinary salts used in medicine; analyse them, and state the result.
4. The powder given to you is also a mixture of medicinal salts; examine it, and state its composition.

Medal	John Watts.
Certificate of Honour	Herbert A. Smith.
Certificate of Merit	Edward B. Goulden.
"	Frederick R. Pasmore.
"	John Bingley.

PEREIRA MEDAL.

This medal is awarded to the student who in the List of Honours has passed the best Major Examination in Materia Medica, Chemistry, and Botany during the session.

The following are the names of the persons who passed in honours:—

	Chave, William F.	36	Number of marks taken by them respectively.
	Gowland, William	37	
	Greaves, William S.	36	
	Hamp, John	35	
	Holmes, Edward M.	38	
	Scruby, William Y.	38	
Medal	Watts, John	39	

MINOR EXAMINATION PRIZE OF BOOKS TO THE VALUE OF TWO POUNDS.

Five persons took equal number of marks; a competition took place; when the prize, Miller's 'Chemistry,' was awarded to John Thomas Mayfield.

The prize is given for highest number of marks on the following subjects:—

MINOR PRIZE QUESTIONS.—PHARMACY AND CHEMISTRY.

1. Describe the composition of Emetic Tartar, the approved processes for its preparation, the changes which take place in its production, the characters it presents in the crystallized state, the tests by which it may be distinguished, the impurities which are most likely to be present, and the means by which these may be detected.
2. What is the composition of Cane Sugar, and in what respects does this differ in composition and in properties from Grape Sugar? How is one of these converted into the other, and what bearing has this upon the preparation and preservation of Medicinal Syrups?
3. Describe the production and preparation of Alcohol by fermentation from Grain, representing the change which occurs in the Malting of Grain, the conditions under which this is made to yield spirit by fermentation, the method adopted for the purification of the Spirit, and for the production of absolute Alcohol. Give the specific gravity of Proof Spirit, Rectified Spirit, and Absolute Alcohol. State the ultimate composition of Alcohol, and the proportions of Alcohol and Water in Rectified Spirit and Proof Spirit.
4. Describe the compounds of Nitrogen and Oxygen, their composition, the methods of producing them, and their properties.

PRIZES FOR HERBARIA.

Professor BENTLEY said that only two collections of plants had been sent this year for competition; this was to be regretted, because nothing so much tended to make a practical botanist as commencing at an early age the collection and naming of plants. Both the collections forwarded were, however, deserving of some distinction, and the Council upon his report had awarded a bronze medal to the first in order of merit, which was that of John James Thorn, a registered apprentice of the Society, residing with Mr. Jackson, Pharmaceutical Chemist, at Crediton; and a certificate of honour to the second, that of Thomas Collier, a registered apprentice, residing with Mr. Collier, Pharmaceutical Chemist, Sheffield.

The medal and certificate were awarded as follows:—

BRONZE MEDAL ....John James Thorn.
CERTIFICATE OF MERIT ....Thomas Collier.

JACOB BELL SCHOLARSHIPS.

Seven candidates presented themselves for examination for the Junior Scholarship.

Successful candidate, Henry William Harris, pupil of Messrs. Ford and Miller, Reading.

One competitor only presented for the Senior Scholarship,

John Watts,

To whom the Scholarship was awarded.

SENIOR BELL SCHOLARSHIP.

ARITHMETIC.

1. What number is that from which if you subtract $\frac{1}{11}$ of $\frac{5}{9}$ of a unit, and to the remainder add $\frac{3}{5}$ of $\frac{7}{8}$ of a unit, the sum will be 9 ?
2. Required the cube root of 122615327232.

LATIN.

1. What is the gender of *phœnix* (the name of a Bird) ?
2. In hypothetical cases, state the two clauses of which they consist.
3. Translate to the end of fifth paragraph of Chap. VI., Book II., of Celsus.

ENGLISH COMPOSITION.

4. Write on the following subject:—The Pharmaceutical Society, its history and prospects. Describe the advantages which have been conferred upon the public and the pharmaceutist.

BOTANY AND MATERIA MEDICA.

1. Describe the different kinds of wood-cells, and mention the plants and parts of plants in which they are respectively found.
2. What do you understand by determinate and indeterminate inflorescence? Define a spike, raceme, panicle, capitulum, umbel, and cyme.
3. What are the officinal sorts of Cinchona bark? State briefly their leading physical characteristics.
4. What are the officinal plants of the Natural Order *Cruciferæ*? State the physical and chemical characteristics of black and white mustard seed.

CHEMISTRY AND PHARMACY.

1. Describe the theories of heat that have been generally received, and especially that which is known as the dynamical theory.
2. Give the composition of potash-alum, representing the quantities of the approximate constituents in 100 parts of the salt, with such details as will show the method of calculation from the well-known atomic formula.
3. An organic body is found to have the following composition:—

Carbon	42·11
Hydrogen	6·43
Oxygen	51·46
	100·00

What is the most simple atomic formula for this body, and how do you arrive at such formula?

4. If a specimen of citrate of iron and quinine were submitted to you for examination how would you judge of its qualities and determine its composition?

JUNIOR BELL SCHOLARSHIP.

ARITHMETIC.

1. Reduce $\frac{3136}{3584}$ to its lowest term.
2. Take $\frac{3}{9}$ from $\frac{5}{12}$.
3. Divide ·37046 by 16.
4. Multiply 4·82 by 3·53.
5. What is the cube root of 125 ?

LATIN.

1. Give the superlative of *citerior*.
2. To what conjugation does the verb *eo* (I go) belong ?
3. What does the ablative denote ?
4. In what case is the subject of a sentence generally found ?
5. State the perfects of the following:—*crĕpo*, *cŭbo*.
6. Translate Phædrus, Fable No. 10, "Lupus et vulpes:"—
"Quicunque turpi fraude sĕmel innotuit"—to the end.

ENGLISH COMPOSITION.

1. Write upon one of the following subjects:—Truth, Genius.

BOTANY AND MATERIA MEDICA.

1. Describe the general characters and structure of starch granules.
2. State briefly the characteristic distinctions between the stems of acotyledonous, monocotyledonous, and dicotyledonous stems.
3. Distinguish between epiphytical and parasitical plants.
4. What is the botanical source of scammony? Describe its physical characteristics, and the tests of its purity?
5. What are the botanical sources of the *officinal* and *Sumatra camphors*, and how may they be distinguished from each other?
6. What are the officinal plants (Brit. Pharm.) of the Natural Orders *Ranunculaceæ*, *Compositæ*, and *Liliaceæ?*

CHEMISTRY AND PHARMACY.

1. What is the composition of Rochelle salt, and how is it prepared?
2. What is the proportion of anhydrous hydrocyanic acid in the diluted hydrocyanic acid of the London Pharmacopœia?.
3. What is the difference in composition between hard and soft soap?
4. What are the proportions of rectified spirit and water in proof spirit, and what is the specific gravity of proof spirit?
5. What is the composition of muriatic acid, and from what is this acid made?
6. How is *Mistura Ferri Composita* of the London Pharmacopœia made? What is the nature of the change which occurs during the process, and also of that which occurs when it has been kept for some time exposed to the air?

The President, after distributing the prizes and certificates to the successful competitors, addressing Mr. Watts, congratulated him, and hoped that on going forth to the world to utilize the knowledge he had obtained he would be as successful as in acquiring it. His great practical education was now to commence; the encomiums passed on him that evening must not dazzle and divert him from his course; it was to him, and such as him (speaking generally to the prize-men), that the Pharmaceutical Society must look for credit and support, and he trusted the connection between them would long continue a source of mutual honour and pleasure to both parties.

A CONTRIBUTION TO THE HISTORY OF BALSAM OF PERU.

BY J. ATTFIELD, PH.D., F.C.S.

DIRECTOR OF THE LABORATORIES OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

There are still some links missing in the history of Balsam of Peru. To Pereira we owe the first precise information as to the localities in which the drug is produced, the tree which yields it, and the method by which it is extracted. Warszewicz, Bailey, Le Nouvel, and Dorat have given their testimony as eye-witnesses to the process by which the balsam is collected; while Hanbury has gathered many historical particulars, which have rendered our knowledge of the subject more exact. To the last-named writer is due the introduction of the tree to the botanical gardens of Europe, as well as to the islands of Jamaica, Trinidad, and Ceylon.

The process which is now followed, in the State of Salvador, for the extraction of the so-called Balsam of Peru is, as we are told, simply this:—the bark of the tree is somewhat loosened and bruised by the blows of a mallet or other blunt instrument. It is then charred by the flames of torches; this occasions it to drop off, and a fluid resin to exude from the now bared wood. This fluid resin is not collected by being simply allowed to flow down into a vessel, but is absorbed by cotton rags, which are laid over the sticky exudingsurface of the trunk, until they have imbibed as much of the resin as they will hold, when they are removed and boiled in water. This causes the separation of the resin, which, after some mechanical purification, constitutes the liquid known in Europe as *Balsam of Peru.* The chemistry also of the commercial balsam has been tolerably well ascertained, and with Fremy, we may regard it as a mixture of volatile oil, crystalline cinnamic acid, and resin. But with regard to the state in which the balsam exists in the tree, and the extent to which it may be altered by the manipulations of extraction and exposure, we know nothing.

It was in the hope of supplying some of these deficiencies in the pharmacology of Balsam of Peru that I recently examined a small branch of *Myroxylon Pereiræ,* sent to me by Mr. Hanbury, and a portion of a section of the trunk of the tree from the Museum of the Pharmaceutical Society. The branch was so young that it contained no heart-wood, but the trunk, which had apparently been about twelve inches in diameter, had dark mahogany-coloured heart-wood, nine inches thick. The bark of the trunk was about a quarter of an inch thick.

The bark, white-wood, and heart-wood of the specimens were each finely rasped and examined separately. In imitation of the method of extraction actually adopted, each was subjected to the action of heat very gradually raised, but no exudation was obtained in either case, nor even any odour emitted at all resembling that of Balsam of Peru. On continuing the application of heat destructive distillation was at last effected, but the product was only the usual acid water and tar obtained on heating any kind of wood.

The characteristic constituents of Balsam of Peru being soluble in ether, the several portions of the specimens were each boiled with that liquid for some time, and after filtration the ether removed by evaporation. By this treatment the bark of the large specimen yielded a soft resin of light-brown colour, the white-wood a similar but less soft residue of lighter colour, and the heart-wood a reddish-brown soft resin, on which, after a day or two, a light-brown oil floated. The odour of these three residues was alike, but strongest in that from the heart-wood; it did not resemble that of Balsam of Peru. On heating these resinous products with water, an odorous steam was evolved, least odorous from the white-wood, most so from the heart-wood, but in each case this odour was also unlike that obtained when Balsam of Peru is similarly treated. Nor had the water an acid reaction on blue litmus paper, as water warmed in contact with Balsam of Peru invariably has, a reaction due to the presence of cinnamic acid. The bark and wood of the small branch yielded small quantities of similar products. The volatile oil of Balsam of Peru being very well characterized by its odour, its absence from the resinous products, obtained as above, may be fairly inferred. The absence of cinnamic acid in the products is also indicated by these experiments, but was confirmed by boiling the several resins with solution of carbonate of soda, neutralizing the resulting liquid by hydrochloric acid and filtering while hot; on cooling, no crystalline plates of cinnamic acid separated out as would have occurred in the case of Balsams of Peru or tolu. Finally, to detect the third characteristic constituent of Balsam of Peru, the resin, each of the products was moistened with concentrated sulphuric acid, which gives a persistent dark-purple colour with Peru and tolu balsams, but in neither case was any such coloration produced.

From these experiments it is obvious that the Balsam of Peru tree contains an oily resin, which is either perfectly distinct from the exudation known as Balsam of Peru, or else is a product of the alteration of the balsam; a production which no trace of the constituents of Balsam of Peru remains.

Concerning the nature of the balsam before exudation from the tree, and the alteration it undergoes in the charring process, we must remain in ignorance until fresh specimens of the bark, wood, and balsam obtained during the season of collection can be examined. The balsam collected directly from the tree should be immediately secured in a well-closed bottle, so as to exclude the action of air upon it. It would also be interesting to know if a balsamic resin could be extracted without charring the wood, for it is asserted by De Laet, as Hanbury has shown, that the charring is only a custom of Indian origin, the Spaniards extracting balsam without the aid of heat. The result of making deep incisions into the trunk of the balsam trees should also be ascertained. Possibly a resin similar to balsam of tolu might be thus obtained. The resin which spontaneously exudes from the Salvador *Myroxylon*, is not balsamic, as I have shown in a former paper, published in the 'Pharmaceutical Journal' for December, 1863.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE EXTRACTION AND PRESERVATION OF AROMATA.

BY CHARLES R. C. TICHBORNE, F.C.S.,
CHEMIST TO THE APOTHECARIES' HALL OF IRELAND, ETC.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

Some time ago I noticed in my garden a vegetable curiosity of some interest. As I was desirous of preserving this *lusus naturæ*, I submerged it in some weak glycerine, considering that that fluid would be less likely to shrivel the tender stems, and also remembering that it had been found most efficient in the preserving of animal tissues.*

The glycerine answered its purposes admirably, preserving the delicate parts in all their *contour*, and at the same time preventing decomposition.

I immediately saw that this property of glycerine might be made available for certain pharmaceutical processes where it is desired to preserve, or to extract the aromata of vegetable products, *i. e.* it is applicable to the preserving of elder, orange, or rose flowers; and also as will be shortly explained, it may be substituted for the oils and fats used in the process termed *enfleurage*.

Flowers for making the officinal *Aqua Sambuci* may be preserved for an indefinite period, the following being the mode of operating:—The elder-flowers should be gathered when the corolla is fully expanded, but not too far gone; they should then be plucked from the stem and packed firmly in wide-mouth bottles or jars without crushing them, and finally be well covered with glycerine and corked. It is not necessary that the glycerine should be pure for this purpose, but it should be devoid of odour and have a high gravity (about 1·240 at 60° F).† The common glycerine made from soap or plaster has generally a slight odour, which must be got rid of before it is used for this purpose. When they are wanted for the distillation of the water, the flowers with the glycerine are put into a still, or what is preferable, the glycerine is expressed and is then found to be saturated with the otto. Water is then added, the quantity being regulated by the original weight of the preserved flowers, or the amount it is determined to distil. I have preserved flowers for two years,

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* Experiments of M. De Marquay, 'Journal de Chimie Médicale.'

† Pure distilled glycerine has generally a specific gravity of about 1·260 at 60° F., but ordinary glycerine may be concentrated upon a water bath until it has a specific gravity of 1·240.

and on distilling them this summer I have procured a water, the perfume of which equalled that made from flowers of this season.

As the essential oil seems soluble in all reasonable proportions, this is a very convenient method of making a concentrated water, either by treating the glycerine after expression with a fresh portion of flowers or by regulating the amount of water added on distillation. This process of preserving flowers will be found to far exceed the old plan of preserving them between layers of salt, particularly as it is almost next to impossible to distil the flowers so preserved without a small portion of the salt being mechanically carried over, which cannot be a *desideratum* in an emollient.

By diluting with water the expressed glycerine, and shaking it with melted lard, and then allowing them to separate, an ointment may be obtained, which has the natural properties and aroma of the elder-flowers.

I will now draw your attention to what may probably be a very useful application of the above properties of glycerine,—I mean in cases where the aroma of the flower is so delicate as to be much injured, if not entirely destroyed, by the application of heat. When such is the case, the extraction of the perfume by glycerine may be substituted for the process of *enfleurage* as now carried on to such a large extent in the Var district, France.* The process would then become one of cold maceration, no heat being employed. After digesting the flowers for some considerable time in the glycerine, the latter is expressed and again treated with fresh flowers until the excipient is thoroughly saturated with the volatile oil; the extraction seems perfect, as the glycerine evidently has a great affinity for the odoriferous essences. (Fresh mint placed over a thin layer of glycerine imparts in a short time a considerable odour to that fluid, although it may not be in actual contact.) The saturated glycerine is diluted with water and shaken with a small quantity of chloroform; after well agitating, the latter is allowed to subside; it carries down with it nearly the whole of the essential oil. The chloroformic solution, after being separated by a funnel, should be filtered, if necessary, and allowed to evaporate spontaneously in a shallow vessel. The residual matter dissolved in spirit forms the spirituous extract of the flower, whatever that may be. If operating upon large quantities it becomes desirable to economize. Therefore in such a case, the greater part of the chloroform may be drawn off in a still, the last portion being allowed to evaporate spontaneously; the boiling-point being so low that even the most delicate perfumes would hardly be deteriorated by the heat employed. Even the offensive smelling bisulphide of carbon, from its ready volatility, may be used; but it must be quite pure, or, in other words, it must be perfectly free from all after-smell on evaporation.

The glycerine may be used over and over again after diluting, passing it through charcoal, and then evaporating it to the desired gravity.

As regards the application of glycerine to the preserving of leaves, etc., for distilled waters, I have myself practically carried it out with great success, having kept flowers for two years, and on opening them, found not only the perfume natural, but the structure of the flowers without the least disorganization. The process proposed as a substitute for the ordinary one of *enfleurage* by fats, of course I merely throw out as a suggestion, as it could only be practically put to the proof at some place where the flowers are cultivated extensively. The great number of men and women employed in the present process at Grasse and Cannes would point out that a great saving would be made both in time and money by a method similar to the above. Another object is that although there

* The commercial importance of this branch of trade may be indicated by the quantity of flowers annually grown in France, *i. e.* 2,284,000 lb. This only includes orange, cassia, jasmine, and such-like blossoms, the perfumes of which are extracted by the aid of fats. (*Vide* Exhibition Record, 1862.)

are large growers at the above-named localities, the mass of the flowers are grown by cottagers, and collected from them by *commissionnaires*. In the glycerine plan the flowers could be placed in perfect safety as brought in, and by this means all danger from heating by fermentation is thrown out of consideration. I have extracted on the small scale, and by the above means, the aromata from *Heliotropium grandiflorum*, *Cheiranthus Cheiri*, and others.

ON COMMERCIAL CARBONATE OF BISMUTH.

BY MR. C. UMNEY.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

Carbonate of bismuth, occasionally used in medicine, is seldom obtained pure, but occurs in commerce mixed with various proportions of basic nitrate of bismuth.

It has been asserted that this nitrate is present in large quantity; it must therefore either be put in as an adulterant, or else be formed in the production of the subcarbonate. The experiments I have made upon six samples of carbonate of bismuth, obtained from six of the principal manufacturing chemists in London, prove the contrary. In one of them it is not to be found at all; and, although the nitric acid can be easily detected in the other five (by boiling the salt with carbonate of soda, neutralizing with hydrochloric acid, and then applying the ordinary sulphate of iron test) the quantity is very minute. It can scarcely therefore be regarded as an adulterant, but rather as an indication of impurity,—doubtless arising from an attempt at economy in the manufacture.

Carbonate of bismuth is generally obtained by the following process:—Metallic bismuth is dissolved in slightly diluted nitric acid, carbonate of soda is then added, which precipitates a subcarbonate of bismuth,—not pure, but containing nitrate of bismuth. The carbonate of soda is preferable to that of potash, for if the latter be used, not only is the nitrate formed as well as the subcarbonate, but also a portion of carbonate of potash is carried down with the precipitate, and is not easily removed by subsequent washing.

Sometimes a mixture of carbonate of soda and carbonate of ammonia is used, but this fails to produce the pure carbonate of bismuth.

The best process, although more expensive than the preceding ones, is to take a solution of the metal in slightly diluted nitric acid, add carbonate of ammonia, dilute the solution, and boil for ten minutes before the precipitate is filtered off. The boiling is necessary, for without it a portion of oxide would be retained in solution by the precipitant.

The composition of the precipitate when so prepared is as described by Lefort (Comptes Rendus, 27–268) BiO_3, CO_2, HO; which gives theoretically in 100 parts:—

Teroxide of bismuth	88·30
Carbonic acid	8·30
Water	3·39

The following are the results of the analyses for the quantity of teroxide of bismuth present in each sample (in 100 parts):—

(1)	(2)	(3)	(4)	(5)	(6)
89	88·5	86·16	87·66	87·66	86·

which, I think, are as nearly uniform as can be expected of a commercial article no better defined than this carbonate.

The carbonic acid present, with one exception, exceeds the normal quantity:—

(1)	(2)	(3)	(4)	(5)	(6)
9·08	8·87	10·95	10·75	8·667	7·28

The amount of hydration in some is less, while in others it is considerably more than the theoretical quantity:—

(1)	(2)	(3)	(4)	(5)	(6)
1·27	2·57	2·75	1·5	3·51	6·71

In none does the percentage of anhydrous nitric acid exceed ·6, in some it is as low as ·03; and in one sample it is totally absent.

ON THE PHARMACEUTICAL APPLICATIONS OF GLYCERINE.

BY MR. F. BADEN BENGER.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

The Edinburgh branch of the Pharmaceutical Society thought proper to award me the President's Prize for an essay on this subject a few months since, and it is from that paper chiefly that I have taken the following notes. It is needless to detain the Members of the Conference by giving a detailed account of the introduction of glycerine into pharmacy, nevertheless I should like to make a few remarks on this part of the subject. Glycerine, as is well known, was discovered by Scheele; but I find considerable discrepancy in the ascribed dates. Watts, in his 'Chemical Technology,' gives 1776; Demarquay, in his recently-published treatise 'De la Glycérine,' Gerhardt, and others, 1779; M. Chevalier, in reporting on a paper by M. Bruere Perrin in the 'Journal de Chimie Médicale,' 1782–83; while Dr. Abbotts Smith and others make it as late as 1789; but the fact that Scheele published his discovery in the 'Transactions of the Royal Academy of Sweden' in 1783, seems to prove the latter date erroneous. It is to M. Chevreul, however, that we are indebted for giving to this substance "a local habitation and a name," which he accomplished about thirty years after its discovery, by demonstrating the true part it played in the constitution of fatty bodies (viz. that of a base, combined with stearic, margaric, and oleic acids). He gave it the name of glycerine, it having been previously known as the "sweet principle of oils." In 1844 it was first used in England as a therapeutic agent, but attracted little attention till the publication of the admirable papers of M. Cap, in the 'Journal de Pharmacie et de Chimie' for February, 1854, and MM. Cap and Garot in the same Journal, August, 1854. These gentlemen pointed out the peculiar advantages offered by glycerine as a solvent, and, by a very complete course of experiments, suggested for it almost innumerable pharmaceutical applications. They devised means of obtaining it in a much greater state of purity from the waste liquors of the soap-boiler than it had hitherto been supplied, but it was found impossible to rid it entirely of the impurities (especially volatile fatty acids) derived from the substances used in the manufacture of the soap. The purest glycerine was at this time obtained during the process of making lead plaster. A very important discovery was made by Mr. Richard Albert Tilghman, of Philadelphia, about this date, viz. the possibility of separating glycerine from fats by the aid of heat and water only. A patent was granted to this gentleman January 9th, 1854. In his specification Mr. Tilghman says, "I subject these fatty or oily bodies to the action of water at a high temperature under pressure, so as to cause the elements of these bodies to combine with water, and to obtain, at the same time, free fat acids, and solution of glycerine." The temperature used by Mr. Tilghman was that of melted lead (612° F.). Great improvements in the details of this process were shortly afterwards made by Mr. G. F. Wilson, F.R.S., of the firm of Price and Co., Vauxhall. As a source of glycerine he employs palm-oil bleached by exposure to the air; this is decomposed in suitable apparatus by steam at a temperature of 550° to 600° F., maintained for several hours. The glycerine is then allowed to distil over with the fat acids and water, and is concentrated by evaporation. Price's glycerine is well known at home and abroad for its great superiority and almost absolute purity, being of necessity free from inorganic matter. For, as Mr. Wilson has himself said, "The only chemical agents used for decomposing the neutral fat, and separating its glycerine, are steam and heat, and the only agents used in purifying the glycerine thus obtained are heat and steam." Mr. Wilson tells me that they are now making one ton per week of this pure medicinal glycerine, and, in order to ensure its perfect purity, it is frequently distilled five or six times. Like Bennett's watches, Price's glycerine leaves "nothing to be desired but the money wherewith to buy it."

It is in external remedies that the greatest field appears to be open for the further introduction of this substance in pharmacy, and I shall first call attention to the compound of starch and glycerine known as "plasma." It had long been thought desirable to find a substitute for fatty matters in ointments not liable to become rancid, and in 1858 Mr. Schacht, of Clifton, read a paper before the Pharmaceutical Society, in which he proposed for that purpose a mixture of seventy grains of starch with one ounce of glycerine, heated together to a temperature of 240° F. The product is a plastic mass well suited in most respects for the purpose, but has been objected to from its tendency to absorb moisture and become fluid by long exposure to the atmosphere. The inconvenience arising from this source, however, might be easily obviated by keeping the plasma in air-tight jars, and dispensing it when necessary in wide-mouthed bottles. A much more serious hindrance to its general use is the fact that it costs about five times as much as the ordinary adipose basis of ointments.

I have made a variety of experiments with "plasma," substituting in its composition for the common wheat starch that of arrow-root, rice, potato, tous-les-mois, etc., all of which yield compounds differing from each other in some of their physical properties. The arrow-root plasma is beautifully transparent, but has an objectionable tenacity if more than sixteen grains to the ounce be used. On the whole, I prefer the tous-les-mois preparation to any other. The best mode of preparing this is, to rub together in a mortar fifty grains of tous-les-mois with one ounce of glycerine; transfer this to a porcelain evaporating-dish, and heat over a gas flame to a temperature of 240°, constantly stirring with an ivory or wooden spatula. (A prescription recently came under my notice, in which an eminent surgeon had ordered starch and glycerine to be heated to this temperature over a water-bath!!) Some pharmaceutists recommend that the plasma should be kept at 240° for twenty minutes, but I see no advantages likely to accrue from this, and unless great care be taken to regulate the temperature the compound will become coloured, and will always be found to have diminished considerably in weight, a result not at all satisfactory to the operator. If the application of heat be continued only long enough to burst the starch granules, or till the mixture becomes transparent, the loss will be about twenty grains to the ounce. The presence of a little water is not detrimental; indeed, I believe it improves the condition of the product, as it will be found more plastic and better suited for rubbing over the surface of the skin: even after it has been exposed to the air a few weeks, and thus absorbed more moisture. M. Surum, a French pharmaceutist, who has paid much attention to the subject, advises ten per cent. of water to be added to the starch previous to mixing it with the glycerine. I do not think plasma would be advantageously substituted for fats in all ointments, but in those cases where there is a great tendency to rancidity, as in the Cer. Calam., Cer. Plumbi Acet., Ung. Zinci, etc. of the old Pharmacopœia, and where the active ingredient of the ointment is soluble in glycerine, as in the Ung. Potass. Iod., Ung. Aconitiæ, Ung. Atropiæ, Ung. Belladonnæ, Ung. Creosoti, and Ung. Veratriæ of the British Pharmacopœia, the plasmas appear preferable to the analogous ointments; it also has the advantage of being easily removed from the skin without the aid of soap or friction.

Those preparations in which glycerine alone is the basis have received the name of glyceroles. Many substances are more soluble in glycerine than in water or alcohol. When an aqueous or spiritous solution is applied to the skin it rapidly becomes dry; and it seems reasonable to suppose that absorption would then be greatly retarded. Glycerine is free from this objection, and its peculiar power of penetrating the pores of the skin renders it the best menstruum for many substances. Dr. Richter, of Vienna, proposed, in 1857, a caustic application, composed of one part of iodine, two of iodide of potassium, and two of glycerine. I am surprised that this in various states of dilution has not been more frequently used instead of the tincture. Glycerine dissolves five grains of iodine to the ounce without the addition of iodide of potassium. A glycerole, composed of tannin one part, glycerine four parts, is a very elegant preparation, and is used as an application to the throat, etc. *per se*, and as an addition to gargles, lotions, injections, etc. One ounce of glycerine dissolves fifteen grains of atropine, and seems to offer some advantages over solutions containing acids in combination with the alkaloid in ophthalmic surgery. Borax is soluble in glycerine to the extent of fifty per cent., and by adding this solution to tincture of myrrh, we obtain a "tincture of myrrh with borax" superior to that prepared in the ordinary manner. The non-resinous vegetable extracts are soluble in glycerine,—a solution of the alcoholic extract of Calabar bean has lately been used with success.

In the other class of medicaments, viz. internal remedies, the use of glycerine has hitherto been more limited. Although glyceroles have often been brought before our notice as substitutes for syrups, I do not find that they generally possess any superiority. I have prepared the glycerole of iodide of iron in two ways:—first, by making a very concentrated solution of iodide of iron (about equal weights of water and iodine with iron wire, *q. s.*) and filtering this solution into glycerine; and, secondly, by a process suggested by Mr. James C. Leamy, of America, in 1848, viz. to make a more dilute solution of the iodide, mix with the glycerine, and evaporate the water over a water-bath. The former is nearly colourless, but remains so only for a few days. The latter is of a pale straw colour, and appears much less liable to undergo further change. A glycerole of carbonate of iron may be made by dissolving separately, each in 2 ounces of glycerine, 76 grains of sulphate of iron and about 60 grains of carbonate of potash, and mixing the solutions. The result will be a pale-green solution of carbonate of iron, containing 1 gr. in f ʒi, which will keep a considerable time without change. The carbonate of iron is thrown down as a flocculent precipitate on the addition of water. Gum Ammoniacum forms a white creamy emulsion with glycerine, in the proportion of ʒi to f ℥i, which, according to Demarquay, does not separate. I imagined this might be useful for the instantaneous production of a kind of Mist. Ammoniaci, but the result of my experience is that the resinous part of the Ammoniacum gradually separates and rises to the surface, leaving an opalescent solution of the gummy constituents below. There is one other use for glycerine which must not be overlooked,—that of an excipient in pill-masses. Alone or diluted with an equal weight of water it is decidedly the best thing for "making up" pepsine and vegetable powders, care being taken not to add too much, and to thoroughly knead the mass. Pills made with this do not become hard, and are therefore always in a condition to be readily dissolved in the stomach. A two-ounce wide-mouthed bottle fitted with a cork perforated in two places, through one of which a piece of quill is inserted for dropping the glycerine from, will be found a very serviceable adjunct to the dispenser's board.

Glycerine has been honoured with a place in the British Pharmacopœia, where however, it has only been thought worthy of acting as a solvent for the tannin in "Suppositoria Tannici." The test there given is that it shall have a density of 1·26 (the new Pharmacopœia of the United States gives 1·25). Price's is almost the only sample I have met with which reaches this standard, the specimens of foreign glycerines I have examined being considerably below the mark, and, with one exception, having a disagreeable odour. This odour may easily be detected by rubbing a few drops on the back of the hand. One of the worst of these importations was advertised as "equal to Price's in every respect." I have not detected much inorganic impurities in the foreign glycerines, and the presence of water would be of comparatively little import, if it were possible to free them from the well-known rancid odour, which renders them totally unfit for pharmaceutical uses. The olfactory nerves of that man must indeed be torpid, who fails to discover a wide difference between Price's and the cheaper glycerines. Should odour, however, not be sufficient proof, let a little solution of nitrate of silver be added to the specimen in a test tube and exposed to the light; Price's will be found to remain nearly colourless, whilst the inferior samples will rapidly become dark-coloured. When we are able to obtain Price's* glycerine, or glycerine equal to it in every respect, at 1*s.* 6*d.* per pound, I have no doubt but it will find many applications in pharmacy from which it is now debarred by its great cost.

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ON THE APPLICATION OF DIALYSIS IN DETERMINING THE NATURE OF THE CRYSTALLINE CONSTITUENTS OF PLANTS.

BY J. ATTFIELD, PH.D., F.C.S.,

DIRECTOR OF THE LABORATORIES OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

Some two years ago ('Pharmaceutical Journal' for March, 1862) I published the results of an examination of the saline efflorescences which are occasionally found on medicinal vegetable extracts. These crystalline out-growths were found to be chloride of potassium or nitrate of potash. The former salt had often been observed, but the latter had not been noticed although it is of common occurrence. From that examination, it seemed that nitrate of potash was a more frequent constituent of plants than had been suspected, and I then proposed the application of a method whereby the presence of it and of similar salts could be detected in the fresh plant. The suggestion was to dialyse expressed juices, concentrated decoctions or infusions of plants, and then to evaporate the diffusate to a small bulk, when it was to be expected that the nitrate of potash, or any other crystalline salt would separate out in a solid and recognizable form.

Since that time I have submitted a few plant-juices, the first that came to hand, to the process, and have obtained results which justify me in recommending the method as one likely to be of great service in the study of vegetable physiology. Crystalline salts can be thus obtained which would inevitably be destroyed in burning a plant for its ash. The following are the details of the experiments:—

Solanum tuberosum.—A few pounds of potato tops were collected and at once crushed and pressed and the juice dialysed for twenty-four hours. On evaporating the diffusate and cooling, small prismatic crystals separated, having all the physical and chemical characteristics of nitrate of potash. Under the micro-

* Mr. Wilson tells me that should the demand increase, the cost of Price's glycerine will be greatly reduced.

scope they were found to be six-sided and to twist a ray of plane polarized light, were not volatile, gave a violet tint to flame, and deflagrated on charcoal; their aqueous solution gave a yellow crystalline precipitate with bichloride of platinum, no odour on heating with caustic alkali, a black colour with sulphate of iron and sulphuric acid, and yielded ammonia on heating with potash, zinc and iron. It was deemed desirable to apply all these tests in this and similar examinations, as a pound of vegetable seldom yielded more than a few grains of crystals, a quantity sometimes too small to purify by recrystallization, and always too small to admit of the production of strongly marked analytical reactions. In the case of potato however I went to the trouble of operating upon thirty or forty pounds of the tops and thus obtained about the same number of grains of nitrate of potash, and the extra labour was rewarded, for the mother-liquor of the nitre, after standing aside two or three days, yielded a small crop of beautiful little crystals, of which I can at present say but little more than that they were not nitrate of potash. They were perfect little hexagons, not much longer than broad, with flat heads; I suspect them to be a magnesium salt. Besides these constituents, the juice of potato yielded cubes, hollow pyramids, and prisms of chloride of potassium, much ammonia and sugar, even immediately after expression, and other matters, the nature of which was not ascertained.

Atropa Belladonna.—The leaves and soft parts of the Deadly Nightshade also yielded nitrate of potash by the above process. But in addition some acicular crystals, single and in tufts, were obtained. These were carefully separated from the nitre crystals and were recrystallized. They were then found to be square prisms, neither deliquescent nor efflorescent, and containing magnesium as the sole inorganic constituent. The nature of the organic matter associated with the magnesium could not be ascertained, apparently it was not any of the ordinary organic acids. The juice of Belladonna also contains ammonia, a matter which reduced copper salts as sugar does, and other bodies not examined.

Pisum sativum.—Several quarts of peas, in the shell, were similarly treated. The product was a thick syrup of light-brown colour, yielding no crystals even after the lapse of several weeks. The ash of a portion of it gave a pure potassium tint to flame, and its solution a slight chlorine reaction. Ammonia was also evolved on heating the diffusate with potash, but no nitric acid could be detected. Apparently, therefore, the fruit of the pea contains no nitrate of potash, and only a minute quantity of any inorganic crystalline salt. The chief organic crystalloid is obviously sugar.

Lactuca sativa.—Half-a-dozen large garden-lettuces were next submitted to the process. Here, again, the concentrated diffusate yielded nitrate of potash. The crystals were however mixed with many perfect tetrahedra, but in quantity insufficient to admit of chemical analysis. The mother-liquor contained sugar and ammonia.

Cucumis sativus.—Several cucumbers were then operated on. They furnished a diffusate, of which the chief constituent was sulphate of lime, but it also gave reactions indicating sugar, and the juice, immediately after expression and again after dialysis, yielded ammonia on warming with dilute solution of potash.

Brassica oleracea.—The juice of three or four cabbages, treated in like manner, also gave a diffusate, from which much sulphate of lime separated on evaporation. It also yielded ammonia when heated with fixed alkali, but besides sulphate of lime no crystals were obtained from it.

Datura Stramonium.—This plant, the Bitter Thorn-apple, I found to contain so much nitrate of potash that a dried portion quite deflagrated on being burned in a muffle.

From these few experiments it is, I think, obvious that this application of Graham's beautiful process of dialysis promises to be of great service in investigating the nature of the crystalline constituents of plants. It may assist u in extending our knowledge of the natural state of combination of the alk a-loids and organic acids; it may demonstrate the presence of salts previous ly unknown, and may show that salts, hitherto only occasionally met with, are of common occurrence. Moreover, by showing the presence or absence or variation in amount of a given crystalline constituent, it will help us in ascertaining the influence which variations in climate and soil have upon vegetables, will doubtless aid in determining more exactly the office of the various parts of plants, and, lastly, may throw light on the changes which go on at different periods of the life of a plant.

ON THE PURITY OF FOREIGN IODIDE OF POTASSIUM.

BY MR. F. C. CLAYTON.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, September*, 1864.)

The results of an examination of a subject like the present may be most easily comprehended by means of a Table.

	French and German.						English.					
	I.	II.	III.	IV.	V.	VI.–IX.*	X.	XI.	XII.	XIII.	XIV.	XV.
Carbonate of Potash ...	·7	·31	·7	·2	·15		0	·14	·28	0	·11	·3
Sulphate of Potash ...	Trace	tr.	tr.	tr.	0		tr.	tr.	tr.	0	0	tr.
Iodate of Potash ...	·8	0	0	·7	tr.	0	0	0	0	0	0	0
Chloride of Potassium	1·56	·3	·5	1·5	3·74		tr.	·52	·31	tr.	·1	·15
Bromide of Potassium	0	0	0	0	0	0	0	0	0	0	0	0
Moisture	1·1	1·4	2·5	2·4	·8		1·2	·9	·6	·5	3·7	1·75
Iodide of Potassium	96·	98·1	96·4	95·4	95·3		98·9	98·4	98·7	99·5	96·28	97·8
	100·16	100·11	100·1	100·2	99·99		100·1	99·96	99·89	100·	100·19	100·

For the sake of comparison, a few samples of English manufacture were analysed and are represented by Nos. X.–XV.

The methods employed for the estimation of the various constituents are as follows:—

Carbonate.—Volumetrically, by means of very dilute sulphuric acid, 10 c.c. of which = ·05 grm. KO,CO_2, an addition of one drop of tincture of litmus being made previous to analysis. The quantity operated on was about two grammes.

Iodate.—Chlorimetrically, by treating a known quantity of pure iodate of potash with tartaric acid and iodide of potassium, and comparing with the contaminated sample in a test tube of the same diameter, etc.

Chloride.—About two grammes were dissolved in the smallest quantity of water, two c.c. of NO_5 added and then chloroform or benzole and more water. Agitate and repeat, adding the chloroform till it ceases to be coloured. The chlorine is left in the aqueous solution and may be estimated by the usual methods.

Bromide.—Precipitate the iodide as subiodide of copper, filter, and treat the

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* Samples VI. to IX. were examined only for iodate and bromide.

clear filtrate with chlorine water and ether. (*Vide* Wood and Bache's U. S. Dispensatory.)

Moisture.—Heat at 250° till the residue ceases to lose weight.

Iodide.—Precipitate the chloride and iodide as silver salts, and subtract from the total the chloride found.

[N.B.—When a sample contains iodate and carbonate, the latter may be estimated as carbonate of lime by the usual methods; and when the iodide is estimated, the resulting iodide of silver contains the iodine due to the decomposition of the iodate, by the addition in the first instance of NO_5.

See also the 'Pharmaceutical Journal,' April, 1864, under the 'Transactions of the Leeds Chemists' Association.]

The Table speaks for itself in regard to the results to be deduced from it.

That old and inconvenient impurity, iodate of potash, is fast disappearing, and here it is that the English samples claim the preferences; still, the quantity is so small, that had the calcination been carried a little further, none of it would have remained undecomposed. Bromide of potassium has been mentioned by various writers (see 'Lancet,' February 20th, on the British Pharmacopœia processes) as a common impurity. However, not even traces have been found.

I have noticed in proceeding with the analyses that those samples known to have been crystallized from spirit contain more moisture than the others (Nos. XIV. and XV.). No. III. is an exceptional instance, through having been transmitted by post, and is only inserted for the sake of the other constituents.

It should also be stated that the samples were of the *best* quality offered by the various makers, though in several instances there were good reasons for suspecting them.

The general conclusion to be drawn is that iodide of potassium, as at present offered for sale, is practically pure.

ON A TEST FOR METHYLIC ALCOHOL WHEN MIXED WITH ETHYLIC ALCOHOL, WITH REMARKS UPON METHYLATED SPIRIT.

BY MR. JOHN TUCK.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

Methylated spirit, as is well known, is a mixture of ten per cent. ordinary wood naphtha with ninety per cent. of spirit of wine. This mixture is allowed to enter commerce duty-free, and has proved a great boon to the arts and manufactures of this country generally. I need only refer to its great use in the beautiful coal-tar dyes, varnishes, polishes, fulminating mercury, spirit of nitre, chloroform, ether, the alkaloids, and resinous principles of drugs, and its application as a cleanly and cheap source of heat in the laboratory, and when mixed with hydrogen as a source of light as well, not to mention numberless other uses to which it has been applied, to show it to be an article of the greatest importance.

From the nature of its manufacture, wood naphtha, or methylic alcohol, will always be a variable mixture; it is never produced by any kind of fermentation, and is met with in the liquid products of the destructive distillation of wood, and it is obvious that these products will be materially affected according to the nature of the wood, and the greater or lesser degree of heat employed in its destructive distillation. These condensed products, consisting of naphtha, acetic acid, acetone, acetate of methyl, acetate of ammonia, oily hydrocarbons, as benzole, toluole, xylole, cymole, and other compounds, such as picamar, eupion, capnomor, pyroxanthin, and creasote, as well as tarry and resinous matters, after standing some time, and being roughly filtered, are submitted to two different processes, in order to separate the naphtha from the acid portion of the liquid. In one process the naphtha is distilled direct from the crude liquor, in the other the liquor is first neutralized with lime, and then distilled; in both cases, however, heat is applied till about one-fifth of the contents of the still has condensed in the receiver. The weak spirit thus obtained is next subjected to repeated distillation, in order to obtain the spirit in a more concentrated form; it is finally rectified with lime, or with a mixture of lime and caustic potash. The naphtha as thus obtained, and as is usually met with, is possessed of a very peculiar strong and disgusting odour, and in this state it is mixed with spirit of wine, and renders it unpotable by communicating to it its own disgusting odour and flavour. By this admixture with naphtha the spirit becomes totally unfitted for all the purposes of a beverage, and therefore the revenue is not on that account at all injured. I am well aware, however, that many erroneous notions exist as to the security this admixture of naphtha with the spirit affords to the revenue, but as the results of many experiments, made both on Eschwege's patent naphtha and the ordinary naphthas, with the object of finding an answer to the question of the Conference, *I think I am perfectly justified in boldly stating that at present there are no known practicable means of separating the naphtha from methylated spirit, nor do I believe it can, nor have I heard of its having ever been done.*

Whilst maintaining the utter impossibility of separating the naphtha from the methylated spirit, I do not deny the possibility of purifying the spirit from the empyreumatic oils upon which the odour of the naphtha previous to admixture depended. I am well acquainted with a patent process by which naphtha itself may be rendered as odourless as spirit of wine. I have a copy of the patent, and have had at different times, samples of this purified naphtha, and of the oils obtained from it and upon which its odour depends; the whole of which were placed at my disposal to aid me in my researches by the kindness of M. Eschwege, the patentee of the "Pure Wood Naphtha." *Nevertheless, I am convinced that there is not the slightest danger to be apprehended to the revenue from this source,—it is impossible to adopt this process to any extent without the knowledge of the excise; an extensive system of filtration and distillation, and consequently almost sure detection, coupled with its illegality, renders the revenue perfectly safe.* Although heartily wishing that pure spirit of wine, duty free, could be supplied for other purposes, such as that of pharmacy and perfumery, for which methylated spirit does not at all answer, it will at once be obvious to all that such cannot be under existing circumstances. I feel convinced too, that the Board of Inland Revenue would gladly grant the boon, if it could be granted without danger to the revenue, but as there appears to be no means of so granting it, we must continue to use a duty-paid spirit for those purposes, as heretofore.

It has, I believe, been stated that a considerable amount of methylated spirit, either "cleaned" or "uncleaned," in a highly cordialized and flavoured state, found its way into use as a beverage under the names of "Gindee" and "Indian Brandie." As such was a decided fraud upon the revenue, and as no ready method of proving the presence of naphtha appears to have existed, it leads me next to consider the best means of detecting it, and its behaviour with reagents of various kinds.

Ure's test for naphtha—the only one, I believe, formerly used or known—consists in adding to the suspected spirit caustic potash; if naphtha were present the spirit was to turn brown, no change of colour was taken to indicate the sample to be pure spirit of wine. This test, however, is not at all a reliable one, the change of colour was principally due to the action of the potash upon the empyreumatic oils dissolved in the naphtha; these being absent, there would, of course, be no change of colour, therefore, it would be reasoned, there was no naphtha present. On the other hand, a spirit of wine containing oils or organic matter in solution would be readily coloured by the caustic alkali, from which it would be inferred to contain or consist entirely of naphtha. The fallacies of the test will be rendered still more evident when I state that Eschwege's patent naphtha and pure spirit of wine are not at all coloured by alkalies.

A test quite as good as Ure's will be found in strong sulphuric acid. If a drop each of spirit of wine, patent naphtha, ordinary naphtha, and methylated spirit, are placed separately on a white slab, and a drop of sulphuric acid added to each, the dark coloration produced will readily distinguish the ordinary naphtha and methylated spirit from the patent naphtha and the spirit of wine; the naphtha itself will be indicated by a very dark colour, the methylated spirit by a much lighter one, whilst the spirit of wine and patent naphtha will be totally unaltered.

The difference in the boiling-point of absolute alcohol and absolute methylated spirit is so slight, only 4° of Fahrenheit (methylated spirit boiling at 169°, alcohol at 173°), and its exact determination being somewhat difficult, I do not think this difference is of much practical value, although a spirit boiling at less than 172° would certainly not be pure alcohol, but then on the other hand, it would not necessarily follow that it contained naphtha.

It occurred to me early in my experimental trials, that there was a possibility of a test being based upon some difference in one or other of the ethers of the respective alcohols, but after many trials I have not met with any success in this direction. Without enumerating them, I should perhaps state here that most of the methylic ethers are remarkably similar in properties to the corresponding ethylic ethers; and when there is a difference, it is of such a nature that it is not at all applicable as a test. The only one I had strong hopes of being successful with was the methyl-oxalic ether. This is formed on submitting naphtha to the action of about its own weight of sulphuric and a like quantity of oxalic acids and then distilling, and occurs in the form of transparent, colourless, rhombic, crystalline plates, which melt at 124° and boil at 322°; this ether is freely soluble in alcohol, naphtha, and water. The corresponding ethylic oxalic ether is a colourless oily liquid, boiling at 363°, and but little, if at all, soluble in water. It was on this difference in the appearance of the two ethers that I at first had some idea of basing a test; but after making many trials, I have come to the conclusion that the difference is not available in any way, for methyl-oxalic ether, although crystalline under ordinary circumstances, does not crystallize in the presence of ethyl-oxalic ether, and both ethers are necessarily present in the distillate on submitting methylated spirit to the action of oxalic acid and distilling. The next trials were upon the difference in their respective solubilities; it occurred to me that if ethylic-oxalic ether was insoluble in water and methylic-oxalic ether perfectly soluble, a method of separating and proving the presence of the latter might be based on its solubility. The mixed ethers could have been washed with pure water, the ethyl-oxalic ether allowed to settle, and the perfectly clear watery solution of methyl-oxalic ether poured off and tested with ammonia, when the formation of oxamide would indisputably have proved its presence; but, unfortunately for this theory, I find that the ethyl-oxalic ether is sufficiently soluble in water to throw down a very decided precipitate of oxamide on the addition of ammonia, so that no reliance whatever can be placed upon this method of proceeding.

The ethers having failed, I next tried the action of various salts and reagents generally; after numbers of trials, many of them with no particular results, I resolved to see what effect a "photographic intensifying solution" would have, composed of biniodide of mercury dissolved in a solution of iodide of potassium, and to which a long time before had been added some solution of potash, in order to try its effects on the salts of ammonia. On adding a few drops of this solution to pure spirit of wine, there was no immediate change beyond a very faint opalescence, but on boiling it there was an abundant dirty yellowish-white precipitate thrown down. On adding a few drops of the same solution to about an equal amount of methylated spirit, there was neither an immediate change nor the slightest alteration after boiling,—the spirit remaining perfectly clear. Here then in this solution was at last found a chemical test which, although negatively, nevertheless, I think, infallibly proves the presence of methylated spirit. I have made many trials of it, both with different samples of spirit of wine and methylated spirit, and always with the same results. The test solution I use is made according to the following form:—

Biniodide of Mercury . .	15 grains.
Iodide of Potassium . . .	25 grains.
Water	1 oz.
Solution of Potash . . .	1 oz. (Pharmacopœia strength.)

Dissolve the biniodide of mercury and iodide of potassium in the water, and when dissolved add the solution of potash.

In using this test I generally put about half a drachm of the suspected spirit in a test tube and add about eight or nine drops of the test to it and then boil; no change indicates methylated spirit, whilst an abundant precipitate proves the presence of pure spirit. I have not been able to try the test on "cleaned spirit," not knowing where to obtain it, but I have no doubt of its action being the same on that as on the "uncleaned" methylated spirit; I have, however, tried its effects on both methylated and pure spirit diluted with an equal bulk of water, and with the same results as when they are in a strong state. In testing spirits, such as tinctures, mixed with or holding in solution organic matters, it will perhaps be best to distil over a few drops of it, although I do not think this will be absolutely necessary in all cases. I have not yet ascertained whether the volatile matters which might accompany the spirit in such a distillation interfere with the action of the test. On this application of the test I hope to read a paper at a future meeting.

I have tried the test solution without the potash, but it has no effect on methylated spirit or pure spirit, either before or after boiling, but on adding the alkali and then boiling, the results are the same as when they are both added together.

In conclusion, I think it right to state that I have not yet ascertained with sufficient accuracy to publish it, the cause of the precipitate in the spirit of wine on adding the test solution. The component of naphtha which prevents the formation of the precipitate in methylated spirit is acetone.

Wilton, near Salisbury, August 30, 1864.

REPORT ON THE WEIGHTS AND MEASURES USED IN PHARMACY.

BY MR. BARNARD S. PROCTOR.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

At the Pharmaceutical Conference held at Newcastle last year, I read a paper on weights and measures, the object of which was to show, roughly, the nature of the changes which have gradually taken place in metrology, to infer from the past the nature of future changes, and the goal to which all changes must tend; to compare various systems, either at present in use or proposed for adoption, and show wherein lay their faults or their advantages, and thus to conclude which would, with the least inconvenience, lead us forward in the direction in which we must inevitably move.

British metrology was found to be full of disorder and inconsistency. The French metric system was held to be incomparably better than any other system which has as yet been brought into practical use; but it also was found to have its faults. The octavial system was recommended as superior to any other for practical use, even when combined with decimal arithmetic, and was held to have advantages also for purposes of calculation, if combined with an octavial system of expressing numbers.

The present paper may be regarded as a continuation of the subject, but is more limited in its scope, as it principally treats of pharmaceutical weights and measures.

My first object is to compare the apothecaries' weights of our own country with those of other civilized nations; then to review what changes have been proposed; and to conclude with a consideration of future changes, briefly taking cognizance of weights and measures for general as well as pharmaceutical use.

Looking over the weights and measures used in Europe, we find about forty different pounds and almost as many different ounces, most of which are established by the laws of the land in which they are used.* Pharmaceutical weights do not take such multiform proportions, some two or three systems being pretty widely used, and, on the other hand, the discrepancies between the different systems are often not so great.

For example, the Nuremberg weights used by the German States are divided as the English, but are a little less than 5 per cent. lighter. Swedish pharmaceutical weights are also divided in the same way, but are about 5 per cent. lighter than the English. Swiss pharmaceutical weights are divided in the same way, but are still a little lighter; and the Prussian a little more than 5 per cent. lighter, but still retaining the same division and the same names, the weight of the pounds in English troy grains being—

English	5760
Nuremberg	5520
Swedish	5501
Swiss	5486
Prussian	5413

As the relation between the pound and the smaller weights is retained, the English may be used for any of the others without inconvenience.

The Genoese and Piedmontese weights, using some of the same names, differ both in distribution and value, thus:—

Genoese.		English.
24 grani	= 1 denario	17 grains.
24 denari	= 1 oncia	407 ,,
12 oncie	= 1 libbra	4892 ,,
Piedmontese.		
24 granotini	= 1 grano	0·8 ,,
24 grani	= 1 denario	19·8 ,,
3 denari	= 1 ottavo	59·3 ,,
8 ottavi	= 1 oncia	474·4 ,,
12 oncie	= 1 libbra	5693·0 ,,

The French metric system, discarding all the old names and old divisors, stands thus:—

French.		English grains.
10 milligrammes	= 1 centigramme	0·1544†

* For full particulars see Woolhouse's 'Weights and Measures of all Nations,' from which much information has been gathered for this paper.

† These numbers are only approximative; the gramme being stated in Redwood's Supplement as 15·4340234; in Miller's 'Chemistry' as 15·432348; in 'Chemical News,' May 31st, 1862, as 15·432349.

		Avoirdupois pounds.
10 centigrammes	= 1 décigramme . . .	1·544
10 décigrammes	= 1 gramme	15·44
10 grammes	= 1 décagramme . . .	154·4
10 décagrammes	= 1 hectogramme . .	1544·0
10 hectogrammes	= 1 kilogramme . . .	2·2057
10 kilogrammes	= 1 myriagramme . .	22·057

It is also convenient to reverse the comparison, and state the value of the English weights in those of the metric scale, thus:—

English.	French grammes.
Grain	0·0648
Scruple	1·296
Dram	3·888
Ounce	31·104
Pound (troy)	373·248
„ (avoirdupois) . .	497·664

In Italy, weights more or less resembling the English are used in the Roman States; but in the Venetian they bear the names of grain, pennyweight, ounce, and pound, while the distribution is decimal. The grain is about $1\frac{1}{2}$ grain, the pennyweight is the French gramme, the ounce is a little more than our troy ounce, and the pound a little less than 3 troy pounds. At Baden, while they have pharmaceutical weights similar to the English, they have for other purposes a decimal system, the smallest weight being 0·77 grain and the pound 7720 grains. Thus, while we find a decimal system almost universally used in scientific chemistry, where the quantities simply require to be expressed upon paper, calculated and compared; we find for practical use, where the quantities are actually to be used, divided mechanically, proportioned to one another or to change of circumstances, that the old systems have been retained with greater persistence; and while decimal weights have been adopted for commercial purposes, that the long-used systems have retained their hold upon the medical profession. This is not so much an indication that the weights used are better in the abstract than others which might be adopted, as it is an indication of the strong feeling which exists in favour of uniformity in medical weights, and against changes which are sure to be followed, for a time, by doubt and difficulty, if not by mistakes of the gravest consequence.

What objections are there to the use of the English apothecaries' weights for pharmaceutical purposes?

In the abstract there is little to be said against it. The gr. ℈i. ʒi. ℥i. and lb. are all convenient units for practical use. The relation which they bear to one another, though a sort of haphazard affair, is not inconvenient. The lb. divides into $\frac{1}{2}$ and $\frac{1}{4}$; $\frac{1}{3}$ and $\frac{1}{6}$, without dividing the ounce. The ounce divides into $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$, without involving fractions of the dram. The dram divides into $\frac{1}{2}$ and $\frac{1}{4}$; $\frac{1}{3}$, $\frac{1}{6}$ and $\frac{1}{12}$; $\frac{1}{5}$ and $\frac{1}{10}$, without dividing the grain. The grain is a small enough unit, and the pound a large enough unit for medical use. The objections are almost all external to the system itself; they arise out of its relation to other systems, from which, in practice, it cannot be abstracted; and this fact let us keep in view as a caution against systems which appear promising when seen only upon paper. However good they may be in the abstract availeth not, for they must be judged by their readiness to fit into other systems,—to fill their own place well and work harmoniously with all collateral institutions. It is in these points that the shortcomings of our present system are found. While we buy and sell by one weight, and dispense by another, both of which have units bearing the same names, but of different values; while we have ounces of water, which, though used for dispensing purposes, correspond to the commercial weights, and drams of water which do not agree with either the apothecaries' or avoirdupois dram; while a pound of water may be prescribed, but who can tell what it means; for it is frequently dispensed as f℥xvi., sometimes as f℥xii., and neither of these is an apothecaries' pound; while we have grains in England which are heavier than grains in Ireland or Germany, and lighter than grains in Austria, and while we require to make a separate calculation for every quantity mentioned in a French formula, before we can prepare it, or even compare it with a formula expressed in English weights,—there certainly are inconveniences in the present arrangement which it is desirable to remove. But even the very statement of these inconveniences shows that no change in our own system can remove them. If we move towards the Irish, we will be further from the Austrian and no nearer the French. If we adopt the metrical weights, unless they be used for all purposes, we will find a greater disparity between our dispensing and our dealing than exists at present. No wonder that all the changes which have been proposed have been rejected; they were all partial evils, not universal good. But to notice more critically several that have been suggested with good promise of advantage, I will begin with the remarks of Jacob Bell. Nine years ago ('Pharmaceutical Journal,' xiv. p. 444), he said, "He was quite sensible of the existing evil, arising chiefly from the confusion between the troy and the avoirdupois weights, but thought it desirable to provide the nearest approach to a remedy with as little change as possible; in other words, he would prefer a reform to a revolution in the system of weights. He thought the best arrangement, under existing circumstances, would be a modification of the troy and avoirdupois weights in this manner, making weights and measures correspond:—

"20 grains	= 1 scruple.	
3 scruples	= 1 dram	= 1 fluid dram.
8 drams	= 1 ounce	= 1 fluid ounce.
16 ounces	= 1 pound	= 1 pint.
8 pounds		= 1 gallon.

"He would suggest the adoption of this modified scale of weights and measures for all purposes, either retaining the present grain, and in consequence increase the larger weights, or, adopting the ounce as the starting-point, reduce the weight of the grain below its present standard."

At the same date, April, 1853, Mr. Griffin advocated a decimal system, founded upon the avoirdupois pound; from which, being 7000 grains, he derives his unit of 7 grains, and calls it a baro,—a baro of water being the unit of measure, under the name of barim. His scale of weights stands thus:—

10 baros	= 1 dram ($\frac{1}{6}$ more).
10 drams	= 1 ounce ($\frac{1}{2}$ more).
10 ounces	= 1 pound.
10 pounds	= 1 stone ($\frac{4}{14}$ less).
10 stones	= 1 cwt. ($\frac{1}{12}$ less).
10 cwts.	= 1 ton ($\frac{6}{11}$ less).

His scale of measures, thus:—

10 barims	= 1 millim ($\frac{2}{7}$ more than f ʒ).
10 millims	= 1 centim ($\frac{3}{5}$ more than f ℥).
10 centims	= 1 decim (= 16 f ℥).
10 decims	= 1 gallon (the same as at present).
10 gallons	= 1 pipe? ($\frac{1}{10}$ present pipe).
10 pipes	= 1 tun? (about $\frac{1}{2}$ present tun).

The scale of weights is almost the same as the Baden weights, which from the pound of 7720 English grains descends decimally to the ass of 0·7720 grains. Griffin's suggestion has in its favour various good points, such as retaining a palpable and readily observed relationship to our present scales of weights and measures, and bringing them into accordance with our system of numbers; while it approaches pretty closely to the Baden weights, and involves only a simple calculation for its mutual conversion with the metric system. Thus, the baro is $\frac{1}{2\cdot2}$ gram; the gram is $\frac{2\cdot2}{1}$ baro, and so on through the other weights and measures of the system. His proposition to retain the names dram and ounce for 70 and 700 grains is unquestionably to be condemned. This he seems to have felt with regard to the measures, as he has adopted the names millim and centim for the corresponding quantities, and he has marked with a (?) the words pipe and tun where they are used for capacities differing much from those at present bearing these names.

The next proposition which it is desirable to notice, is that of Dr. C. Wilson, the object of which was to assimilate weights and measures by the reduction of ounce, dram, scruple, and grain of the present apothecaries' weights. The ounce being made equal to the avoirdupois ounce, and the smaller divisions being derived from it, as at present derived from the troy ounce,—the new grain would be 0·91145 of its present value; the scruple and dram, being 20 and 60 new grains, would also be 0·91145 of their present weight.

The chief recommendation to Wilson's plan is its rendering uniform and consistent all the weights and measures in use in British pharmacy; and this certainly is the first thing for us to aim at. It would also have the merit of making the British pharmaceutical weights more nearly correspond with those most used on the Continent. But on the other hand it is not without serious objections.

At present we have in Britain, one grain, about which there is no mistake; while all other weights are subject to equivocal interpretation. The scruple is 20 grains in England and 18 in Ireland; the dram is 60 grains or 27 grains in England, or 54 in Ireland; so the ounce is 480 or 437 grains; the pound 7000 or 5760 grains. We cling to the grain, reluctant to lose our last unequivocal weight. It has been urged that the change in the grain is only $\frac{1}{11}$ of its weight, and that this being a diminution is on the safe side; but this rendering of the grain an equivocal quantity, counterbalances many advantages which the system as a scale of apothecaries' weights and measures would possess. It also has the disadvantage of reviving the all-but-obsolete avoirdupois dram; and this in the transition state would render us liable to mistakes of the most serious consequence. Even with these disadvantages, the report on weights and measures in the Proceedings of the American Pharmaceutical Association for 1859, declares it an improvement upon the present troy scale.

Next in order, we have the proposition of Mr. Warington.* It is founded upon the avoirdupois pound, which is decimally multiplied, and divided down to 70 grains; he does not advise any weight between 70 grains and the single grain, the use of which he thinks it desirable to retain. The names he proposes have the merit of avoiding confusion, as the pound and grain being old weights retain their old names, and the new weights have allotted to them the designations of tenths and hundredths for those less than the pound, and tens and hundreds for those which are multiples of the pound. Setting aside the question of names, we have simply to decide whether it is better to have the old grain and a 70-grain weight, or the baro of 7 grains, and discard the grain in favour of fractions of the baro. Their merits appear to be about equal.

Turning now to the modified avoirdupois weight which has had a brief trial in Ireland, and the weights at present authorized by the Medical Council, we find further attempts to reconcile the incompatible troy and avoirdupois systems. They cannot both continue to exist; and these struggles at amalgamation are the natural result of an unwillingness to lose the good parts of either. No one

* See 'Pharmaceutical Journal,' xviii. p. 570.

would much regret the loss of the avoirdupois dram, or the troy pound, but no one is willing to part with the avoirdupois pound or the troy grain. So the two systems are pitted against one another; compromise is found impracticable, —the contest is a struggle for existence, a war of extermination which must end in the annihilation of one or both of the competitors.

It is not likely that a scruple of 18 grains and a fraction, or a dram of 54 grains and a fraction, would ever be willingly tolerated; but had the grain been raised to exactly the $\frac{1}{18}$ of the new scruple, it would have been quite satisfactory for practical purposes. The new grain would be 1·01259 troy grains, and the addition of the fraction 0·01259 would be of no importance medicinally, though it would still have the objection of interfering with the certainty and accuracy which are pre-eminently important in scientific matters; *e. g.* if the 1000 grains sp. gr. bottle was constructed for one kind of grain and used with the other, its indications of course would be worthless.

The table, if constructed upon this plan, would stand thus:—

			New grains.		Troy grains.
			1	=	1·01259
18 grains	= 1 scruple	=	18	=	18·229
3 ℈	= 1 dram	=	54	=	54·687
8 ʒ	= 1 ounce	=	432	=	437·5
16 ℥	= 1 pound	=	6912	=	7000·0

This is probably the nearest approach to an amalgamation of the two systems which could be accomplished. It is not in reality an amalgamation, for the troy is totally sacrificed; the only indication of it being the grain, which is altered. The apothecaries' weight is also represented only in name, the scruple and dram being changed from their present English to their present Irish value; ambiguity in the value of these latter weights is less important than in the case of the grain, because of their not being used in occasions where scientific accuracy is important. The objection to the ambiguity of the grain is reduced, in consequence of there being only an error of 0·012 instead of 0·089, or $\frac{1}{7}$ of the amount of deviation from the present standard. Even this is only to be tolerated as being a less evil than the alteration of the ounce and all the weights above it. As a further protection against error when either grain was used for scientific purposes, the old one should be marked troy and the new one "transition grain."

This table cannot be said to look very promising in appearance, yet it is not without its merits. For example, though 7000 is a much more attractive-looking number than 6912, it is not any better for practical purposes, but on the contrary, does not divide so usefully: the latter number divides without fractions by 2, 4, 8, 3, 6, and 9; while the former divides by 2, 4, and 8; but not by 3, 6, and 9,—to set against which 7000 is divisible by 5 and 10, which is not the case with 6912; the convenience of being able to take a third and sixth, more than compensates for the loss of divisibility by 5 and 10. If we look to the division by higher numbers, the superiority of 6912 will be still more evident, which, however, will be best shown by taking the ounce; in one case it contains a fraction of a grain, and of course any fraction of it must do the same, adding however complexity at every step. On the other hand, 432 can be divided into a great number of useful fractions without involving fractions of a grain; thus it is divisible by 2, 3, 4, 6, 8, 9, 12, 16, 18, 24, 36, 48, 72, 144, etc.

The dram of 54 grains, of course, has great advantages over the avoirdupois dram of 27 grains and a fraction, though it does not in the abstract possess any advantage, or scarcely an equality, with the apothecaries' dram consisting of 60 troy grains; thus, 54 is divisible by 2, 3, 6, 9, and 18, while 60 is divisible by

2, 3, 4, 5, 6, 10, 12, and 20. The scruples are almost equally convenient, 18 being divisible by 2, 3, 6, and 9,—20 being divisible by 2, 4, 5, and 10.

The proposition of the American Pharmaceutical Association, unquestionably the most carefully considered, the most elaborate, and most ambitious of the proposed plans, is based on the belief, and I think I may say the well-grounded belief, that for all practical purposes counting by eights has the greatest sum of advantages. It is founded, like the metrical system, on geometrical measurement: a sextant of the equator being 8 times divided by 8, to give their module or radical measure of length ($15\frac{3}{4}$ inches); the cube of this measure gives the root of the table of capacities, under the name of modius. The weight of a modius of water gives the pondus, or root of their system of weights. Their proposed tables are as follows:—

Measures of capacity.				English measures.
		minim	=	0·488 ♏.
8 minims	=	1 morsel	=	3·905 ♏.
8 morsels	=	1 ligule	=	31·244 ♏.
8 ligules	=	1 cup	=	$\frac{1}{2}$ ounce (about).
8 cups	=	1 gill	=	4 „ „
8 gills	=	1 pint	=	$1\frac{2}{3}$ pints „
8 pints	=	1 gallon	=	$13\frac{1}{3}$ pints „
8 gallons	=	1 modius	=	$13\frac{1}{3}$ gallons „
8 modiuses	=	1 butt	=	$106\frac{2}{3}$ „ „
8 butts	=	1 cord	=	850 „ „
8 cords	=	1 vat	=	6600 „ „

Weights.				English weights.
		mite	=	0·464 grains.
8 mites	=	1 grain	=	3·712 „
8 grains	=	1 scrap	=	29·696 „
8 scraps	=	1 dram	=	$\frac{1}{4}$ oz. avoirdupois (about).
8 drams	=	1 ounce	=	4 oz. „
8 ounces	=	1 pound	=	2 lb. 2 oz. „
8 pounds	=	1 stone	=	17 lb. 6 oz. „
8 stones	=	1 weight	=	139 lb. „
8 weights	=	1 load	=	1112 lb. „
8 loads	=	1 ton	=	8896 lb. „
8 tons	=	1 keel	=	71,175 lb. „

This octonary system cannot be regarded as a proposal for the reformation of the weights used in pharmacy, but for revolutionizing the whole system of metrology. It does not harmonize with any other system, and its advantages would be materially reduced if it met with only partial adoption.

The compilers of the British Pharmacopœia have shown their skill in evading a difficulty which they could not overcome. They were bound to use such weights in the work as would not be liable to be misunderstood; they have therefore adopted avoirdupois ounces and pounds, which are in general use both in Great Britain and Ireland, and troy grains, which are also now used in both islands. Drams and scruples, which have a different value on the two sides of the Irish Sea, are not used in their formulæ nor acknowledged in their table, and their disuse is recommended. But this recommendation is not likely to be followed; drams and scruples will still be used and will have different values in the sister isles, so the difficulties will continue till a more potent remedy is discovered.

The metrical system must next claim our consideration, and the advantage o adopting it for pharmaceutical purposes will readily be admitted to depend upon its adoption, either immediately or at no long interval, for general trade use. To attempt its introduction for pharmacy while troy and avoirdupois were still authorized for general trade, would lead to inconvenient complications; not, it may be, of so serious a nature as with systems giving new values to old names, yet of too great importance to be justified by any advantage to be gained from a partial adoption of the metrical system. What would be the advantages of the metrical weights if limited to pharmaceutical use? First, we should be rid of the doubts about drams, ounces, and pounds, for they would all be abolished. We should have concordance between weights and measures, and we would be in harmony with pharmaceutical practice in France, etc., but the disagreement between our trading and dispensing weights would be a constant source of danger. We would have two sets of weights and measures in permanent use; and during the long transition state the weights would be of three kinds,—apothecaries', avoirdupois, and metrical,—and we should have recipes written in all these till the last book using apothecaries' weights became obsolete, when we would again find the weights reduced to two incompatible systems. We should have to keep two sets of dispensing bottles and jars, one series being on the ounce scale, the others on the litre. We should have complications of price, by buying oil, etc., by the avoirdupois pound or gallon, and selling it by avoirdupois pound or ounce, by the fluid ounce, pint, litre, or gram. We should have constant calculation to convert one weight or measure into the other. We should have mistakes arising from the gram and grain. An unusually small dose written in grains might be understood grams, and an unusually large dose written in grams might be understood grains. We should be especially liable to this mistake in those cases, sure to occur, where both kinds of weights or measures were used in one formula, thus—

"Iodid. Potass. . . . 8 grams.
Water . . . . . 8 oz.
Two tablespoonfuls twice a day."

Though we have seen this salt prescribed in doses of less than a grain, and also in doses exceeding a gram, we could not say that the one dose could be innocently substituted for the other.

Something has now been said about the advantages and disadvantages of the various systems which have been adopted or proposed as improvements.

We shall next consider the relative merits of several, under various circumstances. First, supposing that we have to reform pharmaceutical weights without changing any other system now in use. Secondly, supposing we have to arrange a system of weights and measures for general adoption in Great Britain. Thirdly, supposing we have to contrive or select a system most complete in itself, and consequently most deserving of universal adoption, without reference to any systems at present existing.

Under the circumstances first supposed, we have to provide a system convenient in itself, harmonizing, as nearly as may be, with troy or avoirdupois weights, especially the latter, bringing into coincidence our weights and measures of capacity, and involving in the change as little trouble and risk, with as little ambiguity as possible. These requirements appear to be most nearly met in the propositions of Mr. Bell, Dr. Wilson, the Irish system, and the modification of the Irish system which has been pointed out above. Mr. Bell's plan of 1855 left, as an alternative, the reduction of the grain or the increase of the pound and the fluid measures. The latter change he ultimately considered best (see Pharm. Journ. xviii. 594), but this could only be best if commercial as well as pharmaceutical measures were altered. Taking the former proposal, the grain being reduced so that 480 make the avoirdupois ounce, his plan is just that advocated by Dr. Wilson in 1859, and opposed by Mr. Bell on account of the 10 per cent. reduction in the value of the grain. The Irish system agrees with it also, excepting in regard to the grain,—their ounce, dram, and scruple being reduced about 10 per cent.

We may give the preference to the proposal of Bell and Wilson, inasmuch as it sacrifices only one point, that of the grain, to give uniformity in our fluid measures with our weights, and the whole with the imperial measures and authorized commercial weights of the kingdom; while the Irish plan, by retaining the agreement of the apothecaries' with the troy grain, continues the discrepancy between the grain and minim, making 54 grains and a fraction equal the dram and 60 minims equal the fluid dram. It also produces complication in the ounce and smaller weights, from the fractions of the grain involved in them.

The modification of the Irish system which I have ventured to propose would avoid these objections; it would adopt the avoirdupois pound and ounce, the old pint, the fluid ounce, and fluid dram. The dram would still be the eighth of an ounce, the scruple the third of a dram, and the grain would so nearly correspond with the troy grain that the most critical could not object to the change, excepting as affecting some not frequently occurring scientific operations. The greatest change in the value would be in the minim, which in this table is increased from 0·911 to 1·012 troy grains, and this would not involve any risk or inconvenience.

Upon the whole, I believe this would be found the most advantageous change which the pharmaceutical body could make in their weights and measures, seeing that they have not the power to change the other authorized systems of the kingdom.

Secondly, supposing we have to select a system which shall be used for all purposes throughout Britain, there is *not the same necessity* that it should harmonize with the troy and avoirdupois weights, though a simple relation between some prominent weight in each is desirable as a means of converting quantity of one scale into quantity of the other. *There is more need* that it should harmonize with the weights and measures of other countries; there is the same necessity that weights and measures should correspond with one another; also in this case the harmony with our arithmetic, and the abstract convenience of the system must have a larger share of our attention. The ultimate decision of the question depending upon the comparative importance we attach to these several considerations.

It will readily be acknowledged that the most important question is the facility of introduction combined with practical convenience. It is more urgent that we provide facilities for transactions between man and man in our own country than that we should take care of international intercourse. It is more urgent that the new scales should be well arranged in their internal structure than that they should assimilate, either with the scales which they will displace, or to those of other countries with which they will have to co-operate.

The relation of the proposed system to our arithmetical scale, or to the natural processes of halving repeated to any extent, of squaring, cubing, and the extraction of the square and cube roots, must also have considerable weight.

And, lastly, the facility which the same scales may offer for removing the most urgent objections to the present state of confusion, together with their facilitating the adoption of any system which may be eventually found best, will entitle them to more or less of our approval.

The question will now be between that supposed best under previous circumstances, and those then excluded by the required concordance with existing weights.

Regarding the group of decimal scales, Mr. Griffin's, Mr. Warington's, and the metric, the only grounds for giving any preference to the two former is their superior facility for introduction, and their retaining a readily-calculated relationship to the troy and avoirdupois weights, thus facilitating our future understanding of expressions of quantity made under present circumstances; but the facility of their introduction is not so great as to admit of either system being used as a temporary change to promote the subsequent adoption of a more permanent system. Nor are the advantages of their concordance with the English weights so important as to counterbalance the disadvantage of their adoption perpetuating discordance of English weights with a system so extensively used as the metrical. The octonary system of the American Pharmaceutical Association, the only one which can be said to compete with the metrical in regard to completeness and uniformity of arrangement, is also the only one which can compete with it as a plan for universal and permanent adoption. The existence of this rivalry is my strongest inducement for delaying the recommendation of any great change till the merits of octavial, decimal, and it may be also of duodecimal systems have been fully canvassed, and for recommending that the reform of British metrology should, for the present, be limited to such changes as could, without great difficulty, be made in the existing weights and measures, and would render them harmonious and unequivocal. It is on this ground that the modification of the Irish system, which I before suggested for the reform of pharmaceutical weights, I would now recommend for general national adoption—not as an institution to be unchangeable in future ages, but as a simple alteration which could free us from all the great evils of our present want of system, and enable us, at a future time, to adopt any better arrangement with greater facility than at present. The table previously given would, for general purposes, require a little expanding, thus—

Weights.			Measures.		
1 grain	=	1·01259 troy grain.	1 minim	=	1·01259 troy gr. of water.
18 grains	=	1 scruple.	54 minims	=	1 dram.
3 scruples	=	1 dram.	8 drams	=	1 ounce.
8 drams	=	1 ounce.	16 ounces	=	1 pint.
16 ounces	=	1 pound.	10 pints	=	1 gallon.
14 pounds	=	1 stone.	1 cwt. of water	=	11·2 gallons.
8 stones	=	1 cwt.	1 ton	=	224 gallons.
20 cwt.	=	1 ton.			

—the weights above the pound remaining as at present, the measures corresponding to the weights of water up to the pound. The 5-ounce gill, 20-ounce pint, and all measures above the gallon being abolished; though it might be admissible to estimate water, or any other fluid, by the ton, it being an actual weight and not a fluid measure.

Corn and other materials now sold by bushels and quarters would be more satisfactorily estimated by weight, especially in large quantities; also, there is no reason why gold and silver should not be negotiated by the same weights that are used for other purposes, the troy weights being entirely abolished. The rejection of either stone or quarter would be a matter for future consideration; useless weights might at any time be erased from the table if its further simplification was found desirable.

Turning to the third case supposed, that is, that we have to contrive or select the best system possible, without reference to existing customs, which may give a temporary and unreal advantage to those which are made to suit present circumstances. The systems to which I shall draw attention, as suited for this purpose, are the metric decimal and the American octavial.

The advantages of a decimal system are simply that it brings the tables of weights and measures into accordance with our mode of expressing number, every *place* giving a value to the number which occupies it; so that if several numbers are placed together, each has, in virtue of its position, 10 times the value of that to the right-hand of it and $\frac{1}{10}$ of the value of that at the left; and these positional values are multiplied by the value of the digit which occupies the place. Thus in abstract number, 3, 3, 3 signifies 3 hundreds, 3 tens, and 3 units, the middle digit having 10 times the value of the one and $\frac{1}{10}$ the value of the other. But supposing it was money, 3, 3, 3 expressed thus, the middle digit has, in consequence of its position, $\frac{1}{20}$ the value of the left-hand figure and 12 times the value of the right. Had it been the weight marked on a heavy package of goods, 3, 3, 3 might express 3 cwt. 3 qrs. and 3 lb., in which case position gives the middle figure $\frac{1}{4}$ the value of the left and 28 times the value of the right. These changes in the value given by the place which a digit holds are the cause of our requiring constant calculation to reduce numbers of one value to numbers of another; but the decimal arrangement, bringing weights and measures into accordance with the method of expressing number, does away with all this complexity, for in that case, whether it is weight, measure, money or number, the relative value of the places is the same, each being 10 times that of the place to the right of it.

Had our arithmetic been duodecimal, 3, 3, 3 would have expressed 3 gross, 3 dozen, and 3, and in that case duodecimal weights and measures would have brought our metrology into unison with our numeration; and the same may, of course, be said of octavial arithmetic, and in either of these latter cases the adoption respectively of duodecimal or octavial metrology would have given us all the advantages which are now anticipated from the decimal system, and, in addition to these, various others, which, it may be, are of equal or of greater importance.

The report on weights and measures presented to the American Pharmaceutical Association in 1859 contains a brief discussion, and Leslie's 'Philosophy of Arithmetic,' 1817, contains a more elaborate discussion of the merits of various arithmetical scales, and of other matters, which, though of great interest, I do think desirable to include in the present paper. The former contains copious testimony, from high authorities, to show that the decimal scale is not a good one, either for abstract or practical purposes. I make use of its information and of some of its arguments, but as I do not quote the words, I must just make this passing acknowledgment that I am indebted to it. Like the authors of that report, I have come to the conclusion that an octonary scale is best, both for abstract and applied use; but I must satisfy myself with a brief statement of the grounds upon which I have come to that conclusion, together with a statement of what I consider the failings of their plan.

The first consideration is the ready divisibility into the most useful fractions, together with gradations which are neither inconveniently long nor short.

All scales will afford equal facility for obtaining increasing proportions to the unit in whole numbers; that is, supposing 1 to be the smallest number, the decimal or duodecimal scales would be as convenient as the octavial for providing us with the quantities 2, 4, 8, 16, or 32, but not for $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$; so with the octavial and duodecimal scale, we have not facility for obtaining the fractions $\frac{1}{5}$, $\frac{1}{10}$, $\frac{1}{20}$, etc.; and with the octavial or decimal scale we cannot produce $\frac{1}{3}$, $\frac{1}{6}$, $\frac{1}{12}$, etc. It is almost unnecessary to adduce evidence to show the greater utility of those fractions whose denominators are a power of 2. Evidence may be found in all directions; I shall only draw attention to a few striking instances.

We have a pound sterling consisting of 20 shillings; $\frac{1}{5}$ and $\frac{1}{10}$ might have been expected consequently to appear as common fractions in the silver coins, but the $\frac{1}{5}$ has never appeared and the $\frac{1}{10}$ only as the result of the recent attempt at decimal division; those which sprang up spontaneously were the $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$. The half sovereign is the only one of these which is commonly spoken of as a fraction of the pound, except where values are stated in pounds and fractions, such as, for example, share lists, where we find constantly the fractions $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$ or $\frac{3}{4}$ and $\frac{3}{8}$, but rarely $\frac{1}{3}$ or $\frac{1}{6}$, and never $\frac{1}{5}$ or $\frac{1}{10}$.

Of old coins, the noble and the mark—$\frac{1}{3}$ and $\frac{2}{3}$ of the pound—have fallen out of use, while the angel has retained its value, but changed its name to $\frac{1}{2}$ sovereign. The angel and shilling were our only coins holding a decimal relationship to one another; now that the former has become a half-sovereign it has ceased to be distinctively a decimal coin, and the florin has been introduced with the view of making the pound a unit on a decimal scale.

In lineal measures, where the yard is almost exclusively used for trade purposes, we have similar evidence of the preference for binal division. The yard consisting of 3 feet or 36 inches, affords facility for the use of ternary fractions, such as $\frac{1}{3}$, $\frac{1}{6}$, $\frac{1}{9}$ or $\frac{1}{12}$, but, instead of these, in actual use we find $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, and $\frac{1}{16}$; also the inch, which consists of 3 barleycorns or 12 lines, is not thus divided for actual use, but again we find the useful fractions $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, and $\frac{1}{16}$.

In measures of capacity we have dry measure where the number 4 occurs four times as a factor, 2 occurs four times, and 5 only once. Wine measure has 4 occurring twice and 2 twice, but no number representing the decimal scale. Ale measure has 4 twice, 2 five times, 3 once, and 9 once, but no number representing the decimal scale.

In weights we have—troy, with the numbers 24, 20, and 12; apothecaries', with 20, 3, 8, and 12; avoirdupois, with 16, 16, 14, 2, 4, and 20. Here we find "20" counting three times for the decimal scale; we have 24, 12, 3, and 12, for the duodecimal; and 8, 16, 16, 2, and 4, for the octavial.

Looking to pharmaceutical practices for evidence regarding the comparative utility of decimal or octavial scales, we find a general preference for the latter. Concentrated infusions and decoctions are made so that 1 part equals 8 of the normal strength. The great majority of bottles used for dispensing, etc., are founded upon octavial numbers of ounces. 1, 2, 4, 6, 8, 12, and 16, are the current sizes. 20 ounces are not frequently used, 10 ounces still more rarely, and 5 ounces quite unknown. Looking at the posological table, in 36 cases taken at random, the minimum dose was to the maximum—

In 11 cases as	1 to 2.
In 10 "	1 to 3.
In 2 "	1 to 4.
In no case as	1 to 5.
In 2 cases as	1 to 6.
In 3 "	2 to 3.
In 8 "	3 to 4.

Thus there are 21 instances in which the octavial scale would most readily meet the wants of the case; 15 in which duodecimal would have the advantage; but no instance in favour of the decimal,—no doubt, because the decimal scale does not so readily express these simple relationships.

Turning to Thompson's 'Conspectus,' we find a table of doses for patients of different ages, founded upon the full dose for an adult; thus:—

Age in years	1	2	3	4	7	14	20	21
Dose . . .	$\frac{1}{12}$	$\frac{1}{8}$	$\frac{1}{6}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{2}{3}$	1

Supposing the full dose to be a unit of a quantity divided duodecimally, all these fractions would be obtained in the simplest possible manner: had the unit been divisible octavially, the fractions $\frac{1}{8}$, $\frac{1}{4}$, and $\frac{1}{2}$ would have been obtained without dividing the next smaller grade of quantity; had it been decimally divided, the $\frac{1}{2}$ is the only case in which the smaller grade would not be again divided; the $\frac{1}{4}$ involving two lower grades, and the $\frac{1}{8}$ involving three lower grades. If the full dose were a multiple of the quantity at first supposed, the duodecimal scale would retain the good qualities it at first exhibited; and the other two scales would improve; thus if the full dose were 3, 6, or 9, the octavial or decimal would supply all the required fractions both accurately and readily; but if the full dose were 5, the octavial scale would hold its original quality, and the decimal would be one step worse, in consequence of the half dose then involving two grades of weights, and the $\frac{1}{4}$ and $\frac{1}{8}$ of the full dose each involving 3 grades of weights.

Taking at random 22 prescriptions, I found the relation between the separate ingredients, and the total quantity to be of an octavial* nature in 32 cases, to be of a duodecimal† nature in 10 cases, and of a decimal‡ character in only 1. I found the total quantity, estimated as a multiple of the smallest ingredient, was 13 times octavial, 6 times duodecimal, and only once decimal. I found the number of doses ordered was 9 times octavial, 6 times duodecimal, and only once decimal.

The division of paper into pages for a book is almost necessarily done by binary or ternary folding; we have folio, quarto, octavo, etc., and duodecimo, but no division by tens.

The mariner's compass is necessarily divided by fours and powers of fours.

Many other instances might be adduced in which the natural process is evidently doubling and halving repeatedly performed; but I do not know of any instance in which division or multiplication by 5 or 10, is by the force of natural circumstances a matter of necessity. This repeated halving, a matter of necessity in some cases, a matter of convenience in others, has become a matter of habit in almost all. To adapt our weights and measures to this fact is to adapt ourselves to our circumstances, and work in harmony with natural laws. To establish a system which does not afford facilities for this natural process, is to work in ignorance of natural laws, if not in direct opposition to them; and nothing established upon such a foundation can be eminently convenient, or permanently successful.

Having now discussed the relative merits of octavial and duodecimal division, and having in my former paper pointed out what I considered the principal failings of the metrical system, I have now only to point out those particulars in which I think the American octonary scale may be advantageously modified.

There is no great advantage in deriving a system from a natural standard; and if the standard weights or measures are to be repeatedly derived from the so-called natural source, they will be liable to variation, either from the "natural source" itself varying, as in the case of the foot; or our estimate varying, as in the case of the metre, the pendulum, or the cubic inch of water.

The commissioners on "standards of weight and measure" appointed by Government in 1838§ state in their report, that the best determinations of the weight of a cubic inch of water in England, France, Austria, Sweden, and Russia, varied among themselves to the extent of $\frac{1}{1200}$ of their weight. At another part, they say with regard to weights brought for examination, "that no greater error than $\frac{1}{20000}$ part of the quantity weighed, be tolerated." If we accept these statements, it is useless to hope for any cube of water being a source of standard weights. We should have, instead of the cube of water being the source of the weight, a law stating that the cube of water was to be considered so many grains; reverting to an empirical standard, only retaining a proximate relationship between length on the one hand, and weight and capacity on the other. From such considerations, they recommend "that the standard of weight be defined by a certain piece of metal or other durable substance,"—"that the standard of capacity be defined by the capacity which, under certain circumstances of the barometer and thermometer, contains a certain weight of distilled water; but that it be in no way defined by reference to the standard of length." If we relieve ourselves from any supposed necessity for deriving our standard of

* Octavial, that is, as 1 to 2, 4, 8, 16, 32, 64, or 128.

† Duodecimal, that is, as 1 to 2, 3, 4, 6, 12, 24, 36, 48, 72, or 144.

‡ Decimal, that is, as 1 to 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, or 100.

§ Consisting of Messrs. Airy, Baily, Bethune, Davies, Gilbert, Herschel, Lefevre, Lubbock, Peacock, and Sheepshanks.

length from any of these so-called natural sources, and of deriving the root of our scales of weight and capacity from that of lineal measure, we are at liberty to select any root which custom or other circumstances might render convenient; and provided it does not contravene any natural principle, it has as much claim to be considered a natural standard as if it had, by some artificial process, been obtained from the circumference of the earth, or the vibration of a pendulum.

If we accept the modified avoirdupois weight as a transition scale, the pound would naturally become our root, both of weight and capacity; and the inch or foot would be a suitable root for lineal measure, which would have the advantage of preserving a convenient relationship, and mode of converting the old quantities into the new notation, and would enable us to continue the use of established rules for converting bulk of various materials into weight.

The report of the American Pharmaceutical Association speaks approvingly of the practice of calling new weights by old names. I must express my disapprobation of such a practice. I think one of the weak points of their scheme is the calling 34 ounces a pound, $4\frac{1}{4}$ ounces an ounce, and $\frac{1}{2}$ ounce a dram; their proposed pint is 41 ounces, and their gallon $16\frac{1}{2}$ imperial pints.

The octonary table, founded upon the avoirdupois pound, would stand thus:—

1·7097 grain.
13·6781 grains.
109·425 grains.
2· ounces.
1· pound.
8· pounds.
64· „
512· „
4096· „

Objecting to all long compound names, and to all names having already another value attached to them, I would suggest the use of names derived from some object of about the weight to be expressed; thus, the use of the word grain suggests the word "pea" to express 1·7097 grains, and "nut" for 13·67 grains. The strangeness of using these familiar words in a new sense might be obviated by using the Latin, this however involves an objection from the formation of the plural by other modes than the common English rule. Adopting English words, the table might stand thus:—

Measures.	Weights.	Equivalent in present weights.
Dew . . .	Pea . . .	1·7097 grains.
Sip . . .	Nut . . .	13·6781 „
Spoon . . .	Plum . .	109·425 „
Cup . . .	Egg . .	2 oz. avoirdupois.
Can . . .	Pound . .	1 lb. „
Hat . . .	Cat . .	8 lb. „
Tub . . .	Ram . .	64 lb. „
Cask . . .	Ox . .	512 lb. „
Tank . . .	Wain . .	4096 lb. „

If the English inch were retained as the root of the new long measure, the table would stand as follows, the names attached being merely suggestions, but convenient enough for use in discussion:—

Lineal measure.

Point	=	$\frac{1}{64}$ inch.
Pearl	=	$\frac{1}{8}$ „
Inch	=	1 „
Span	=	8 „
Lad	=	5 ft. 4 „

Lineal measure.

Tree	=	42 ft. 8 inch.
Field	=	113 yds. 2 ft. 4 „
Lane	=	about 912 yards.
Road	=	about 7296 „

The cubic inch of water (252·5 grains) would be 2·307 plums, the cylindrical inch = 1·814 plums. The cubic span would be 2·307 hats, and the cylindrical span would be 1·814 hats. The pound of water would be, as at present, 27·7274 cubic inches or 21·777 cylindrical inches; a "cask" or "ox" of water would be 21·777 cylindrical spans. It is to be observed, that though a decimal division of weights is inconvenient for the practical production of eighths or sixteenths, an octavial division of weights does not impede the use of decimal fractions in calculations, so long as our arithmetic is decimal; and if arithmetic itself should become octavial, the new weights would be in perfect harmony with a system of octavial fractions still more excellent than our present decimals.

Octavial money could be adopted with little difficulty. The present currency would scarcely require alteration; taking the pound and its eighth, two useful coins now in circulation; and making the groat, by a small reduction, $\frac{1}{8}$ of the half-crown, the halfpenny by a similar reduction would be $\frac{1}{8}$ of the new groat. We have thus the elements of a new money-table almost without change in our current coins; these however would have to become coins of account, and thus involve a change, but only a simple one in book-keeping.

On the adoption of the octavial weights, measures, and money, the figures 8 and 9 would fall into comparative disuse; the former being expressed as "1" of the higher order, thus, 1 0; and the latter as one of the higher order *plus* one, thus, 1 1: this would be the first step towards octavial numeration if it was found desirable.

In summing up a few figures, it will readily be seen, thus:—

Tare . . .		4	7	2	2
Net . . .		6	4	5	7
	1	3	4	0	1

But these matters are too far in the future to require further discussion at the present time; and in quitting the subject let me express a hope that I have not done injustice to any of the projects criticized; and if I have ventured to recommend other changes in preference, it is only by the light shed from those who have preceded me that I hope to have carried the matter one step nearer to a satisfactory arrangement.

11, *Grey Street, Newcastle-upon-Tyne.*

ON MICROSCOPICAL RESEARCH IN RELATION TO PHARMACY.

BY HENRY DEANE, F.L.S., AND HENRY B. BRADY, F.L.S.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

In these days of "popular science," when every one possesses and is supposed to *use* a microscope, it may seem to some to be a matter requiring apology, to bring before an Association, counting amongst its members so many men eminent in the practice of a scientific profession, any considerations under so diffuse and general a heading as that appended to the present paper. It is not however our object to occupy the time of the Conference, to more than a very limited extent, in old and well-worn lines of scientific inquiry, but rather to explain and illustrate certain applications of the microscope to purposes of research, which so far as we know have been but little followed out, at any rate with reference to pharmacy. In other branches of science more or less connected with medicine the microscope has been extensively used, contributing largely to the advances which have been made during recent years in their development, and we may allude especially to Chemistry, Materia Medica, and Toxicology, as the medical subjects affecting pharmaceutists, which have been participators in the progressive movement.

In Chemistry proper the uses which have been made of the instrument may be defined under two heads; firstly, the facility with which minute quantities of crystalline bodies may be detected and identified; and secondly, the ease with which the effect of a ray of polarized light passing through a body, is observed by its means. The phenomena recently detailed by Mr. Tomlinson in his papers on the "Cohesion Figures of Oils and other Liquids," though often observed with advantage on a small scale by means of magnifying powers, scarcely come within the range of microscopical research, and belong rather to physical than chemical science.

In a subject like Materia Medica, where the field is so wide and various, the microscope has naturally been called into requisition in the investigation of numberless obscure and ill-understood points; and much of the value of the great work of Dr. Pereira (*i. e.* so far as the original matter is concerned), arises from his extensive knowledge of the instrument and the constant use he made of it. Of the advances in knowledge which have been made by its employment, in the examination of materia medica substances, we need only make passing allusion to a few. One of the first of those which strike us is that peculiar protean body Starch. We know how readily the starches from many plants are now recognized and their origin traced:—the form of the granule, its size and physical condition, and its peculiar polarizing properties, characters which differ remarkably in the various fæculæ used as food, are easily observed under high magnifying powers, presenting distinctions of which either physician or pharmaceutist may avail himself in the practice of his profession, with manifest advantage. Again, the existence of many crystalline active principles in crude vegetable products, such as aloine in liquid aloes, the cinchona alkaloids in cinchona bark; of essential oils and resinous constituents in the Umbelliferæ, Coniferæ, and other Natural Orders of plants; the presence of peculiar inorganic matters, as oxalate of lime raphides in Russia or China rhubarb, and in the various products, of the Liliaceæ, or the constant absence of such raphides in the whole Order Umbelliferæ,—all of these have been made the subjects of more or less successful and valuable research.

The identification of drugs by their microscopical appearance is a process so often resorted to that it is needless to enumerate the cases in which it is available, and the alterations which occasionally take place in medicinal substances by the generation of animal and vegetable life have been demonstrated in a similar manner by Dr. Attfield, Mr. Rimmington, and many other observers.

The investigations made by one of us for the late Dr. Pereira as to the different physical conditions presented by carbonate of magnesia in the light and heavy states, are sufficient evidence that in inorganic materia medica the same means is equally serviceable in widening our range of knowledge; the results obtained in this case affording a beautiful instance of the operation of the great law of spherical coalescence, which, since that time, has been so ably investigated and laid down by Mr. Rainey in his elaborate researches upon organized tissues.

If the degree of comminution of medicinal powders be a matter of the consequence it is generally supposed to be, nothing but the microscope will assist us in its determination. We were recently called upon, in a case of some importance, to give an opinion on the relative merits of certain articles of this class of English and French preparation, from microscopical examination and measurement.

In Toxicology, again, we find equally important results follow its use. In some cases when searching for poisonous substances which yield *no reactions* to chemical tests, such as savine, we are compelled to rely upon the microscope solely as our guide; and in others where chemical tests do afford evidence, as in nux vomica and many other characteristic vegetable structures, valuable collateral testimony may generally be obtained thereby.

The question of the adulteration of drugs and articles of food is one by itself and beyond our province,—the Conference has a committee devoting itself to the subject, and the able and zealous microscopists who are working upon it will, we doubt not, give evidence of the value of microscopic analysis in this important matter.

Having thus briefly touched upon the field which lies around it, we may now proceed to what more particularly appertains to our own subject, viz. the Application of Microscopical Research to Pharmacy. To seek to draw a well-defined line between pharmacy, and chemistry on the one hand, or materia medica on the other, would be a hopeless task, and it is one which we shall not attempt. Some of the examples named in a former paragraph, such as the observations on carbonate of magnesia, might be considered as belonging to any one of the three subjects; but there are still certain phenomena observable with the microscope which come more properly under the head of pharmacy than either of the others, and it is to these that we would address ourselves.

The phenomena alluded to are those *resulting from pharmaceutical processes,* viewed especially with reference to the condition in which constituents of drugs exist in their preparations.

It was originally our intention to have communicated to this meeting a summary of the results of a series of investigations comprising the examination of the preparations of a considerable number of drugs, but circumstances have prevented our bringing the work to that state of reasonable completeness which the Conference has a right to expect of the papers presented to it, and we have consequently to ask their acceptance of an instalment only, and this instalment is offered, rather as a preliminary research illustrating the mode of operating than with any more ambitious aim.

We have chosen for the particular subject of the present communication, the various preparations of opium. Whether regarded in respect to their importance in the practice of medicine, their variability in strength and character, or the peculiar conditions in which the active matter exists in the crude drug, no better subject could be found for the purpose in view.

Opium, as is well known, is an extremely composite substance, being a pasty mass formed of resinous, gummy, extractive and albuminous matters, containing a larger or smaller percentage of certain active principles diffused through it. These principles are morphine, narcotine (with its two homologues), codeine, narceine, meconine, thebaine, and papaverine, either existing free or in combination with meconic, sulphuric, or other acids, the sum of the crystalline constituents, exclusive of inorganic salts, contained in good samples of the drug being from twenty to thirty per cent. of its entire weight. Any preparation, exactly to represent opium, must contain the whole of these principles, as indeed the tincture may be said fairly to do.

It has however been shown that some of the principles are inert, and others even deleterious in their action, and we have consequently had a class of preparations introduced which are understood to be of superior efficacy, not from their containing any active matter which the tincture does not contain, but because they are free from certain substances which are retained by it. Narceine, meconine, and meconic acid are believed to be inert, whilst narcotine possesses properties widely different from those for which opium is usually employed. Of the bulkier constituents, the resin appears to be worse than useless, whereas the bitter extractive, though opinions differ with regard to its precise properties, seems at any rate to increase the narcotic power of the more active constituents. A typical preparation of opium should therefore at least contain the whole of the morphine and codeine, with meconic or some other acid to keep them in solution, and the bitter extractive. Codeine itself, and the salts of both codeine and morphine, are readily soluble in either water or alcohol, the remaining principles are fully dissolved by alcohol, but scarcely soluble in water; hence, in the preparations alluded to, water rather than alcohol is used as the solvent.

The process we adopt in examining the constituents of a fluid preparation of this sort under the microscope is a very simple one.

Having, as a preliminary step, taken the specific gravity, and ascertained the percentage of carefully dried extract contained in it, we evaporate a small quantity, usually from four to six drachms, on a sand-bath in a watch-glass, to about the consistence of treacle. It is then poured upon a slip of glass and covered with a piece of thin glass, and after standing a few days, it is sealed in with gold-size. Crystallization sometimes commences before the preparation is removed from the watch-glass, sometimes immediately after transferring to the glass slip, but in many cases not for several days. The time taken is dependent on one of two influences, viz. the quality of the opium, and the exact degree of inspissation.

In determining the value of a preparation from the appearance of this extractive under the microscope, we do not rely entirely upon the amount of crystallization, it is requisite to go one step further to obtain the full value of our labour, and by investigating the form and physical characters of morphine and its compounds, of codeine, narcotine, meconic acid, etc., place ourselves in position to see the significance of the appearance the slide presents, and to identify any crystalline principles which may be present. Nevertheless, even in the absence of very accurate knowledge, any one who will make a few experiments for the sake of practice, will soon be able, by observing the presence or absence, the abundance or scarcity, of certain forms of crystals easily seen in typical specimens, to pronounce with little hesitation on the quality or genuineness of samples of any of the ordinary preparations of opium.

Before proceeding to speak of the opiates which have come under our examination, it may seem necessary to say a few words on the forms assumed by the various opium principles and the physical characters their crystals present. This, together with certain drawings we have made carefully from specimens, will afford a key to our further remarks.

In the first place:—

Morphine.—The pure alkaloid crystallizes in right-rhombic prisms often running into needles. The single crystals have but little effect upon the polarized ray, but where the solution has been concentrated (as from alcohol), and the acicular crystals are much overlaid, they present a good deal of colour. (Plate I. fig. 1.)

It is exceedingly difficult to say in what condition morphine exists in opium; we are well aware that it has been set down as meconate, with a smaller percentage of sulphate, but we have reason to suspect that sulphate is present to a larger extent than is generally supposed. The messing and manipulation which all kinds of opium appear to undergo before they reach this country, renders the belief which is suggested by other circumstances, that a portion of the meconic acid is decomposed, extremely probable. It is scarcely likely that a substance which even boiling water decomposes, evolving carbonic acid, should remain unchanged through the various treatments to which the drug is subjected.

Meconate of Morphine is set down in chemical works as being uncrystallizable, a statement to be accepted with reservation; for by careful manipulation peculiar conical crystals may be obtained either from the solution of the commercial salt in dilute alcohol (Plate I. fig. 3 *b.a.*), or by the evaporation of mixed solutions of morphia and meconic acid (Plate I. fig. 3 *b.b.*). These crystals do not resemble any which are found on evaporating opium solutions, but as we have said, the subject requires more investigation than we have as yet been able to give to it.

Sulphate of Morphine takes the form of small flat-ended prisms, with a strong tendency to collect in radiating tufts; the larger flat crystals only polarized (Plate I. fig. 3 *a*).

Codeine crystallizes in octahedra running into four-sided prisms. In the octahedral condition it is not easily mistaken for any other of the opium alkaloids, but the prisms strongly resemble those of narcotine. (Plate I. fig. 4 *a*).

They may be distinguished by their not presenting the fluted or striated surface which crystals of narcotine have, and by their much less striking effect on the ray of polarized light.

Narcotine occurs in the form of prisms, with oblique one or two-faced ends. As above stated, the surface of the crystals is fluted or striated, and on pressure they break up into tolerably regular smaller crystals (Plate I. fig. 2). Owing to a sort of composite structure, they have very marked effect on the polarized ray, more striking indeed than any other of the opium principles. Were it not for this property, they would be distinguished with great difficulty from many other crystalline substances which they resemble in form. There is a tendency, as in other cases, to cluster together in more or less radiating tufts, but the individual crystals still keep their shape and do not degenerate into mere radiating plumose needles, like those of narceine.

Narceine.—As narceine exists in opium in about the same percentage, on the average, as morphia and narcotine, it is of greater consequence in these investigations than it is in a medical point of view, being probably an inert substance. It is readily soluble in alcohol, and slightly so in water, and therefore must exist to considerable extent in most of our preparations. The absolute form of the individual crystals it is impossible to determine, but the masses of delicate, somewhat opaque, silky needles, either radiating from a centre or taking an irregular feathery shape are very characteristic, and the absence of any effect on a ray of polarized light is a negative property of importance. (Plate I. fig. 6 *a.*)

Meconine occurs in six-sided prisms with dihedral summits, and has little, if any, polarizing power. (Plate I. fig. 5 *a.*)

Thebaine is readily soluble in alcohol, slightly so in water. From solutions in weak alcohol it crystallizes in beautiful rectangular plates, often associated in tufts more or less radiating from a centre. (Plate I. fig. 4 *b.*) It is a most beautiful polarizing object.

Papaverine is present to so trifling an extent that it scarcely requires notice. The little which is dissolved by boiling water crystallizes out again on cooling in minute needles often aggregated in rounded balls, so closely packed as to be quite opaque. The large crystals obtained from the alcoholic solution possess slight polarizing properties (Plate I. fig. 6 *b*).

Meconic Acid.—Although the meconate of morphine in opium is an acid salt, it seems probable that part of the meconic acid is also there in a free state; at any rate, we frequently find it in preparations. As it is soluble in both alcohol and water, preparations are pretty sure to contain whatever quantity does exist in the crude drug, unless it has been removed by chemical means. The form of the crystals is primarily a square prism, but we have only seen this in minute examples, and it is very difficult to trace the relationship to this type in the flat, pointed lozenges, somewhat resembling the attenuated forms of uric acid, which generally occur. Even these frequently run into still more strange varietal shapes, whose only resemblance to the lozenge-form exists in their broad centres and two pointed ends (Plate I. fig. 5 *b*). They all have some effect on the polarized ray. Boiling water decomposes meconic acid; carbonic acid is given off, and komenic acid, a substance we have not yet studied, is formed.

We may now proceed to the practical application of the facts enumerated, and detail the results of the examination of the many preparations which have come under our notice.

Of *Turkey Opium* we have investigated—firstly, the tincture, prepared by ourselves from different samples of opium, as well as specimens procured from certain well-known operative chemists; secondly, the extract; thirdly, the wine; fourthly, the more or less aqueous solutions sold as Liquor Opii Sedativus, Battley's, one or two samples prepared by ouselves, and specimens procured from four well-known firms; and fifthly, certain proprietary opiates, viz. "Black Drop," "Jeremy's Sedative," "Nepenthe," and that sold as "Solution of Bimeconate of Morphia."

We have drawn careful figures of the appearances presented by the whole of these, which will do more than any description towards giving a correct understanding of the facts elicited; at the same time, it may be necessary to draw attention to some matters of importance in connection with them. We must be excused giving the name of the makers from whom specimens have been obtained, in most cases, as it is not our object to sit as inquisitors on our pharmaceutical brethren, though in one or two instances, where we have nothing but good to say, we may, without offence, break this rule.

Tincture yields, on evaporation, crystals of almost the whole of the opium principles, and we find that, as the spirit volatilizes, the resin is also precipitated in an insoluble form. Our own preparation, from different samples of good opium, is tolerably constant (Plate II. fig. 1 *a* and *b*), and agrees in appearance with a specimen procured from a manufacturing house of some standing (Plate II. fig. 3); but neither are quite so rich in crystalline principles as a sample furnished to us by our friend Mr. Morson (Plate II. fig. 2), which seems to have been prepared from peculiarly fine opium.

Extract shows a much smaller proportion of narcotine crystals, with abundance of morphia salts and tufts of narceine (Plate II. fig. 4). Turkey opium is not rich in codeine, and we suppose that in extract prepared from it this principle is retained diffused through the bitter matter. A specimen of *commercial* extract of opium which we have seen, recently imported from the East, is a very different substance, showing fewer morphine crystals, but a large proportion of codeine (Plate II. fig. 5).

Wine.—The mucilaginous matter of wine very much retards, if it does not entirely prevent, the formation of crystals upon evaporation, and consequently we can say but little respecting the appearance presented by the extract obtained from vinous solntions.

Liquor Opii Sedativus.—The striking appearance resulting from the evaporation of Battley's Sedative (Plate III. fig. 1) first drew our attention to the mode of investigation now described. We have examined it frequently, and always have met with the same characters. The slides present an almost opaque mass of crystals of morphine salts and codeine, with a very small proportion of narcotine (and meconic acid?), and, so far as we have observed, complete absence of resinous matter and narceine. Any one who has studied the microscopic characters of this preparation will readily understand how it has kept its place with the profession in spite of the cheap imitations which have been so largely puffed as substitutes for it. We have necessarily thought much as to its probable mode of preparation, and cannot see any reason to doubt the statemant made by Dr. Pereira, on the authority of the late Mr. Battley himself, that spirit and water were the only materials used in its preparation from Turkey opium. Dr. Christison discredits the statement, on the ground of the comparative absence of meconic acid; but, as we have before said, boiling water is sufficient to decompose that acid, and therefore the argument is not a valid one. Though we have experimented much with a view to preparing a similar liquor, we have not yet arrived at an identical result. Plate III. fig. 2 *a* and *b*, shows two preparations with similar, perhaps nearly equal, sedative properties to the original fluid; but it will be seen they both differ considerably in the crystalline matters they contain. It is perhaps only justice to say that the preparation which gives results most nearly like Battley's of any which we have had opportunity of testing is that made by Mr. Morson, of London (Plate III. fig. 3). Of three other makes which we have examined, one (Plate III. fig. 5) is largely charged with resinous matter, and the proportion of crystalline constituents is so minute that we are satisfied its activity must be very small; another (Plate III. fig. 4) gives a few morphine crystals, a good deal of narcotine, and more narceine; a third (Plate III. fig. 6) is chiefly remarkable for its lack of everything crystalline.

There are certain preparations, to which we must next allude, which give little or no evidence as to the active matters they hold in solution by crystallization on evaporation. As examples, we may instance Vinum Opii, amongst officinal, and Braithwaite's black drop, Nepenthe, and a fluid sold as "Solution of Bimeconate of Morphia," amongst proprietary formulæ. That there should be exceptional cases in which the reaction to a certain peculiar set of tests is doubtful, is only what might have been expected, and it can scarcely be regarded as a weak point in their application. Scarcely any *chemical* test we use but is open to some contingency of the same sort, but as long as we know the conditions of uncertainty it is no drawback to its employment; it only becomes necessary that these conditions should be investigated, and comparison becomes easy.

We have found that when opium is exhausted, the liquor evaporated to an extract, and this extract redissolved in alcohol, that the tendency to crystallize is very much lessened or entirely destroyed. The cause of this we are not yet able to explain with certainty, but may state the fact as one which we have noticed in relation to every sort of opium we have worked upon. It will account for the very sparing indications of crystalline principles from all preparations made by redissolving in alcohol a once-formed extract. The residue not taken up by alcohol in the experiment is readily soluble in water, and contains certain crystalline matters, which we have not yet examined sufficiently to report upon. Again, the subacid viscid matter left on evaporating wine prevents crystallization, consequently Vinum Opii gives a clear non-crystalline extract; we believe this also to be the reason why one of the proprietary preparations named yields the same result, as it seems to us to be a mere solution of morphine or one of its salts in wine, and not to be made direct from opium. The well known "black drop" gives no crystals upon evaporation, but in their place a peculiar deposit, consisting of an amorphous, almost opaque fæculence. This is probably owing, in great measure, to viscid matter held in solution, which on evaporation becomes insoluble through some change and is precipitated, carrying down with it the active matter. We know too little of the solvent employed to speak very positively, but if the commonly received theory be true,—that it is made by a fermentation process, in which impure malic acid is concerned,—we can readily understand how viscid organic matter may be present in sufficient quantity to produce the result alluded to.

In addition to the preparations of Turkey opium, we have also had the opportunity of experimenting on small quantities of the Patna, Malwa, and Persian varieties, and all of them present peculiarities of interest. An aqueous extract and a tincture have been made from each, and from the Patna sort sufficient has remained to make a specimen of liquor.

The most striking fact in connection with the whole of them is the existence of large quantities of codeine. In the extract of Patna opium (Plate IV. fig. 1) it is the chief crystalline constituent, and though the liquor (Plate II. fig. 6) shows abundance of the other opium principles, it evidently owes its narcotic effect much more to codeine than Turkey opium does. We have the experience of an opium eater on this point; he states that the quantity required to produce the effect is larger, but there is less discomfort in the after effects than with other sorts. Malwa opium (Plate IV. fig. 2 and 5) shows more narcine and narcotine, but in the tincture we have in addition to a mass of minute crystals, certain larger prisms, which are probably codeine. Persian opium (Plate IV. fig. 3 and 6) also evidently contains a large proportion of narcotine and codeine.

We stated at the commencement that this must be looked upon only as a preliminary research, there remaining many points on which our information is far from complete. In continuing the inquiry we intend to devote ourselves chiefly to the elucidation of certain particulars. *Firstly*, the condition or form of combination in which morphine exists in crude opium; *secondly*, the relation of extract of poppy to opium in respect to crystalline principles; and *thirdly*, the influence which the extractive matters may have in altering the crystals obtained in opium solutions, and the variations of the normal forms induced by this cause.

The general conclusions we have arrived at in addition to a knowledge of the appearances presented by typical and special preparations of Turkey, Patna, Malwa, and Persian opiums, are mainly these:—

That tincture, most nearly of any of the preparations, represents the properties, good and bad, of the crude drug.

That when crude opium is taken up with proof spirit as in tincture, the resin separates on evaporation.

That the preparations which have held their ground with the public and the medical profession, in spite of price, differ from the tincture in comparative freedom from resin and narcotine, and in containing only a diminished quantity of meconic acid.

That in the preparation of extract of opium it is important to use a large quantity of distilled water to ensure the separation of narcotine and resin.

That when extract of opium is dissolved in water, filtered and evaporated again to an extract a second or third time, the crystals frequently differ considerably from those seen in the normal or first formed extract.

That when extract of opium is taken up with rectified spirit 56° O.P., and evaporated again to an extract, crystallization does not take place, or only to a very trifling extent.

That morphine and its salts, and perhaps other opium principles, do not crystallize readily from their solution in wine.

Finally, it remains for us to express our obligation to our friends Mr. Morson, of London, and Messrs. T. and H. Smith, of London and Edinburgh, for the courteous way in which they have assisted us with specimens, when working upon those of the alkaloids which exist only in minute quantities in opium; without this assistance we could scarcely have procured them in a state of reliable purity.

In some remarks which followed the paper, the authors drew the attention of the meeting to a new alkaloid procured from opium by Messrs. T. and H. Smith, a specimen of which they were enabled to lay before the meeting through the kindness of the discoverers. They stated that for want of time and sufficient quantity to work upon, the Messrs. Smith had not yet determined its chemical composition nor all of its reactions, but exhibited to the members present the brilliant colour-reactions which the minutest quantities yielded, viz.:—a deep blue on treating with concentrated sulphuric acid, turning rapidly to bright green on the addition of a small crystal of nitrate of potash.

EXPLANATION OF PLATES.

Plate I.

Microscopical Appearance of Opium Principles.

Fig. 1. Morphine.
,, 2. Narcotine.
,, 3 *a*. Sulphate of Morphine.
b. Meconate of Morphine.
ba. Commercial salt crystallized from solution in weak alcohol.
bb. Crystallization from mixed solutions of Morphia and Meconic Acid.
,, 4 *a*. Codeine.
aa. Crystallized from Alcoholic solution.
ab. Crystallized from Aqueous solution.
b. Thebaine.
,, 5 *a*. Meconine.
b. Meconic Acid.
,, 6 *a*. Narceine.
b. Papaverine.
ba. Crystallized from Alcoholic solution.
bb. Crystallized from Aqueous solution.

Plate II.

Fig. 1. Tinctura Opii (Turkey Opium), prepared by the Authors as standard.
,, 2, 3. Specimens of Tincture alluded to in the text.
,, 4. Extractum Opii (Turkey).
,, 5 *a*. Commercial Extract of Opium, imported.
b. The same, re-dissolved, filtered, and evaporated.
,, 6. Liquor Opii Sedativus, prepared from Patna Opium.

Plate III.

Liquor Opii Sedativus (Turkey Opium).

Fig. 1. Battley's.
,, 2 *a*, *b*. Two specimens prepared by the authors by slightly different processes, from different samples of opium.
,, 3. Mr. Morson's, alluded to in the text.
,, 4, 5, 6. Specimens sent out by three operative chemists of standing in London.

Plate IV.

Fig. 1. Extractum Opii, prepared from Patna Opium.
,, 2. ,, ,, Malwa Opium.
,, 3. ,, ,, Persian Opium.
,, 4. Tinctura Opii, prepared from Patna Opium.
,, 5. ,, ,, Malwa Opium.
,, 6. ,, ,, Persian Opium.

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* The Plates will be given in the December Number.

MICROSCOPIC APPEARANCE OF OPIUM PRINCIPLES.

PLATE 1.

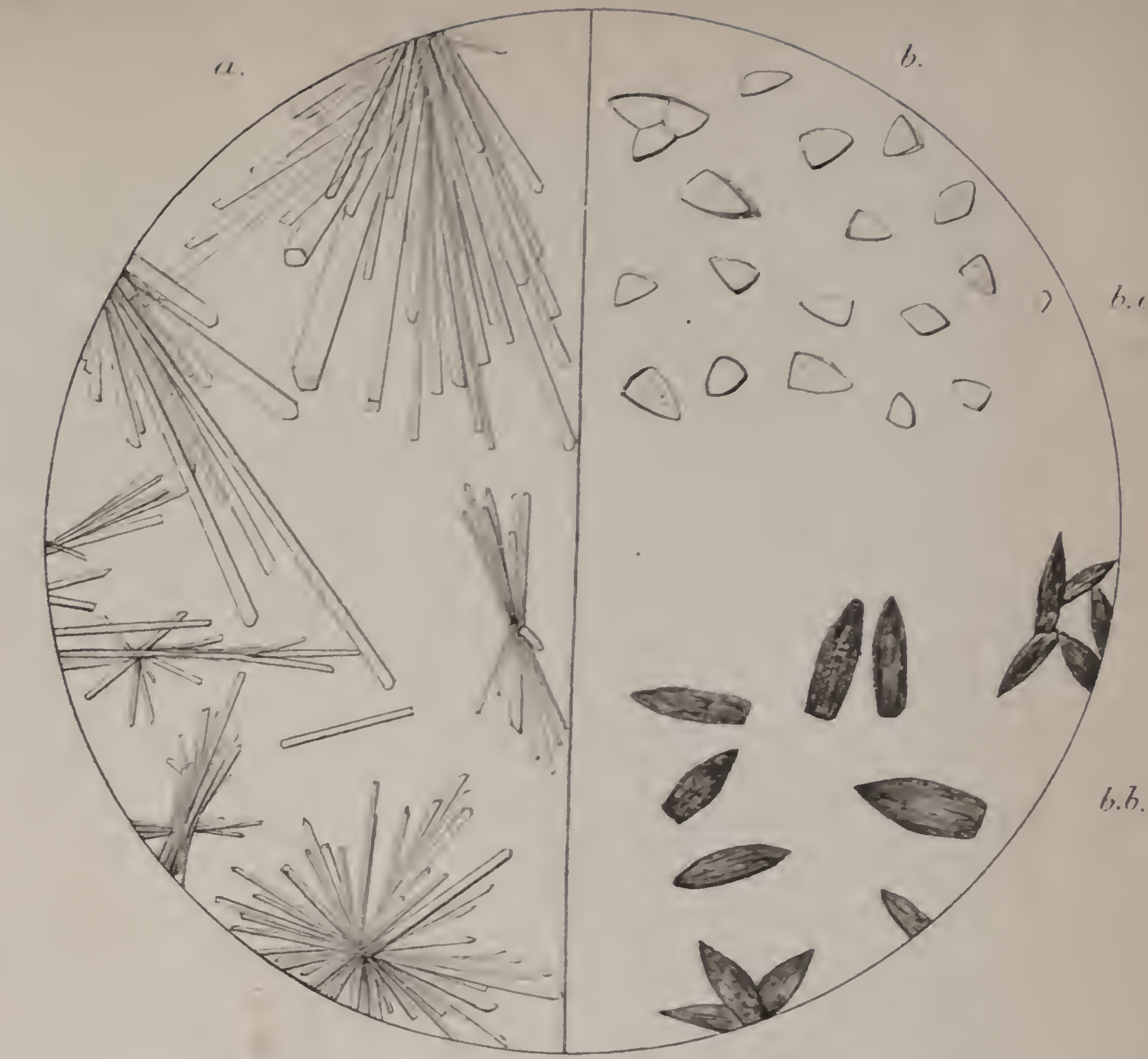
FIG 1.

MORPHINE.

FIG: 2.

NARCOTINE.

FIG: 3.



SULPH MORPHINE. MECONATE MORPHINE.

FIG. 4.

CODEINE. THEBAINE.

FIG: 5.

MECONINE. MECONIC ACID.

FIG: 6.

NARCEINE. PAPAVERINE.

H. B. Brady, del. ad. nat.

Tuffen West. sculp.

TINCTURA OPII, &c.

FIG. 1

FIG. 2.

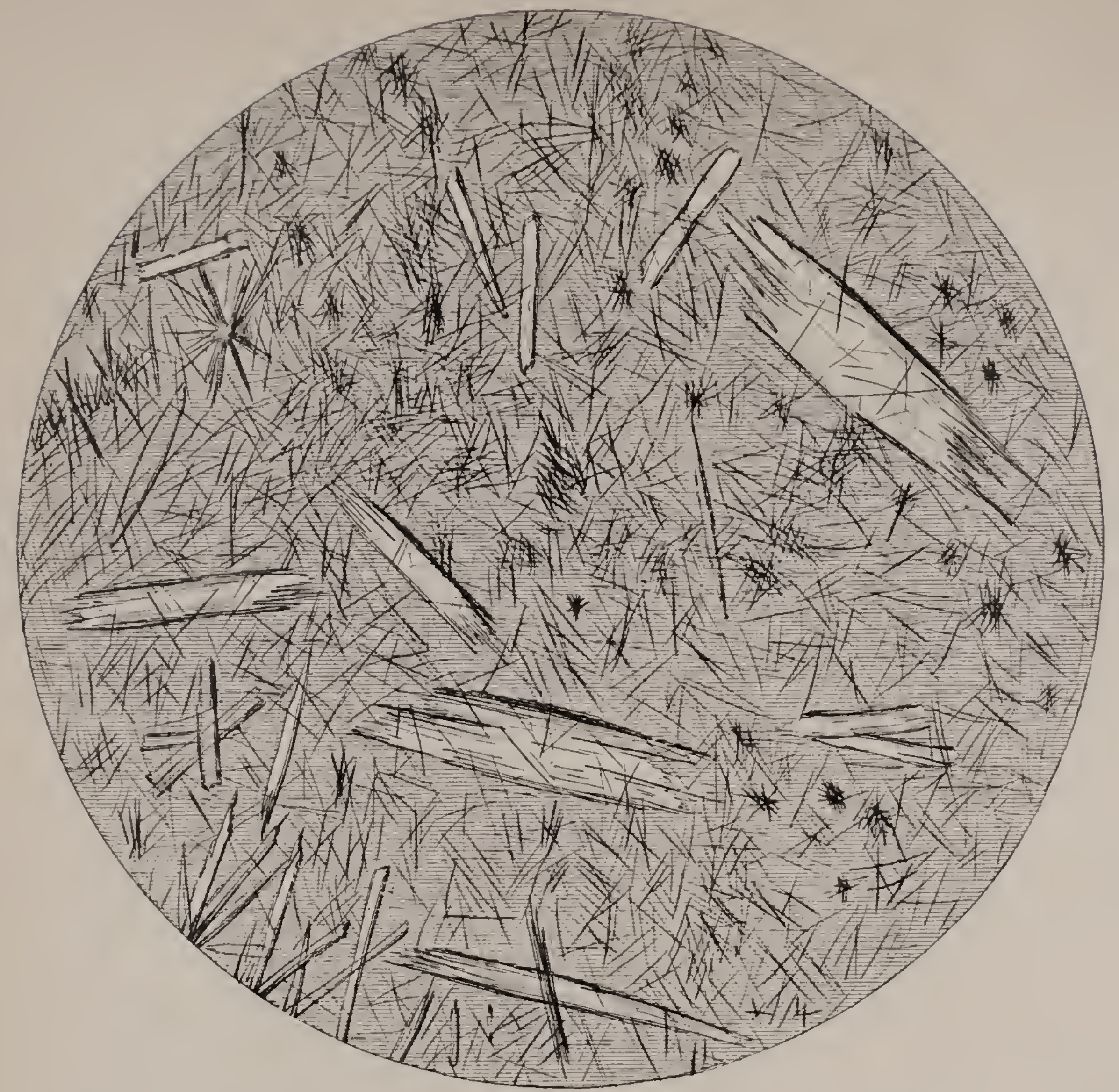


FIG. 3.

FIG. 4.

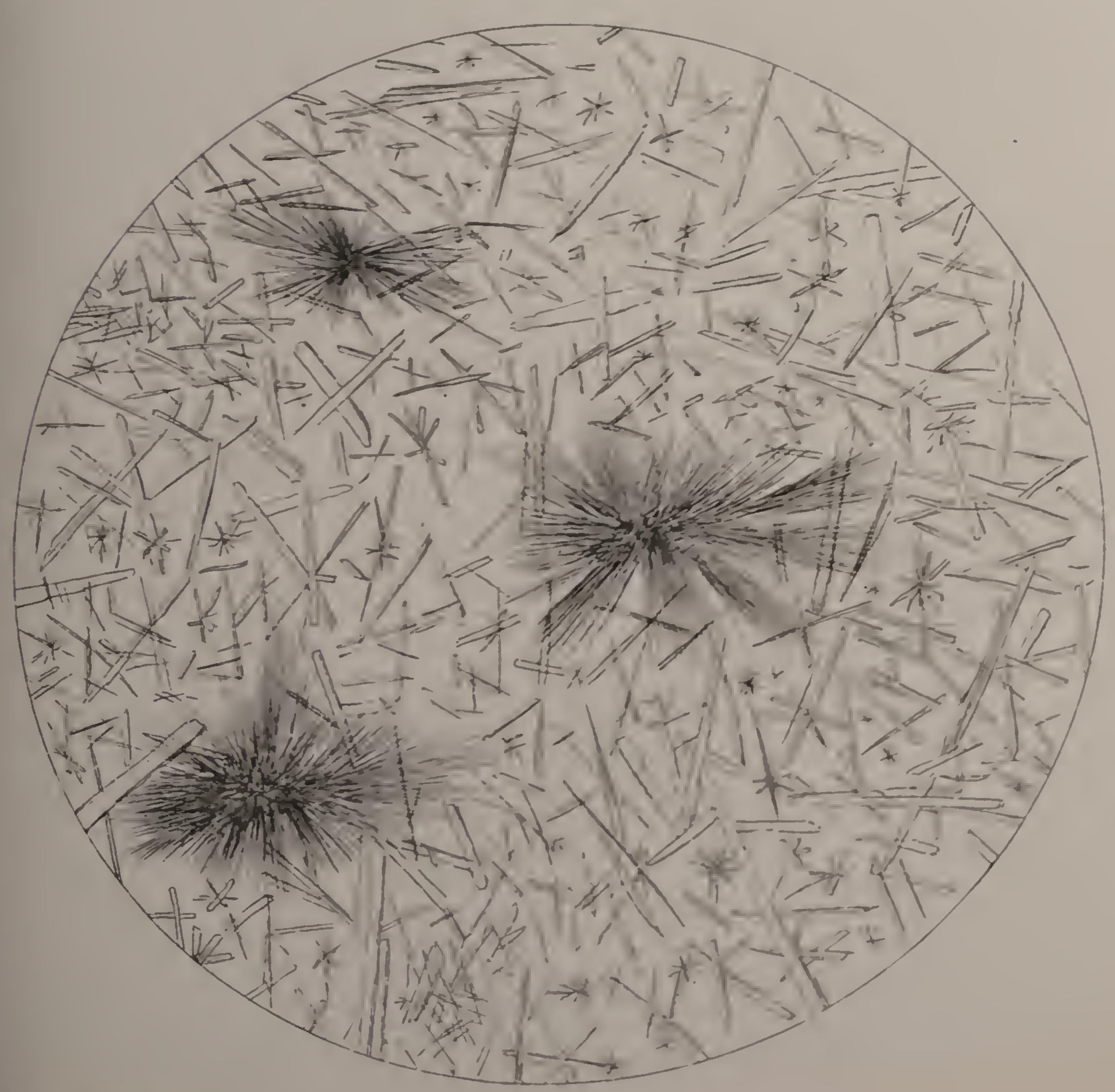


FIG. 5.

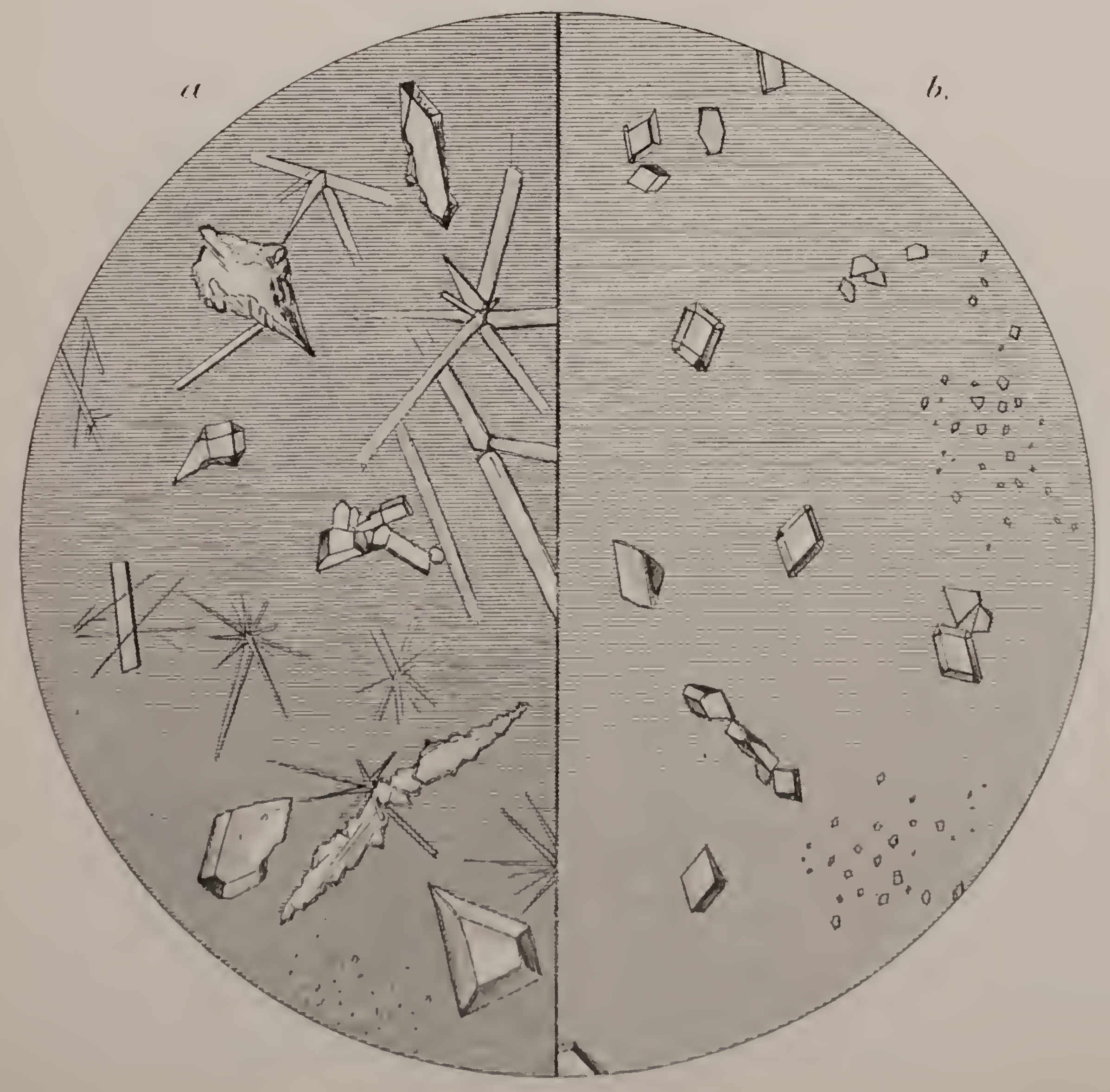
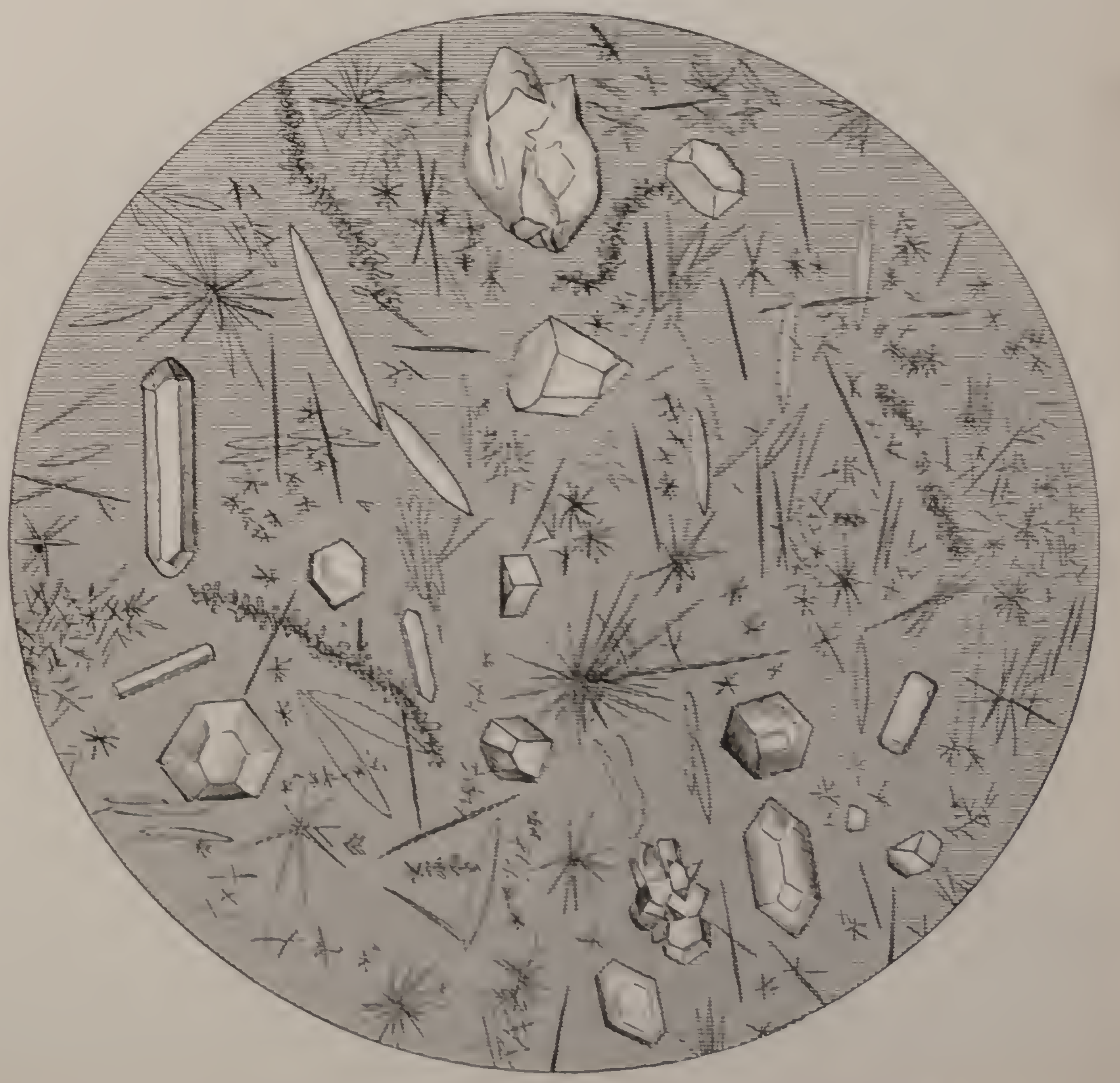


FIG. 6.



H.B. Brady del. ad nat. Tuffen West, sculp. W. West imp.

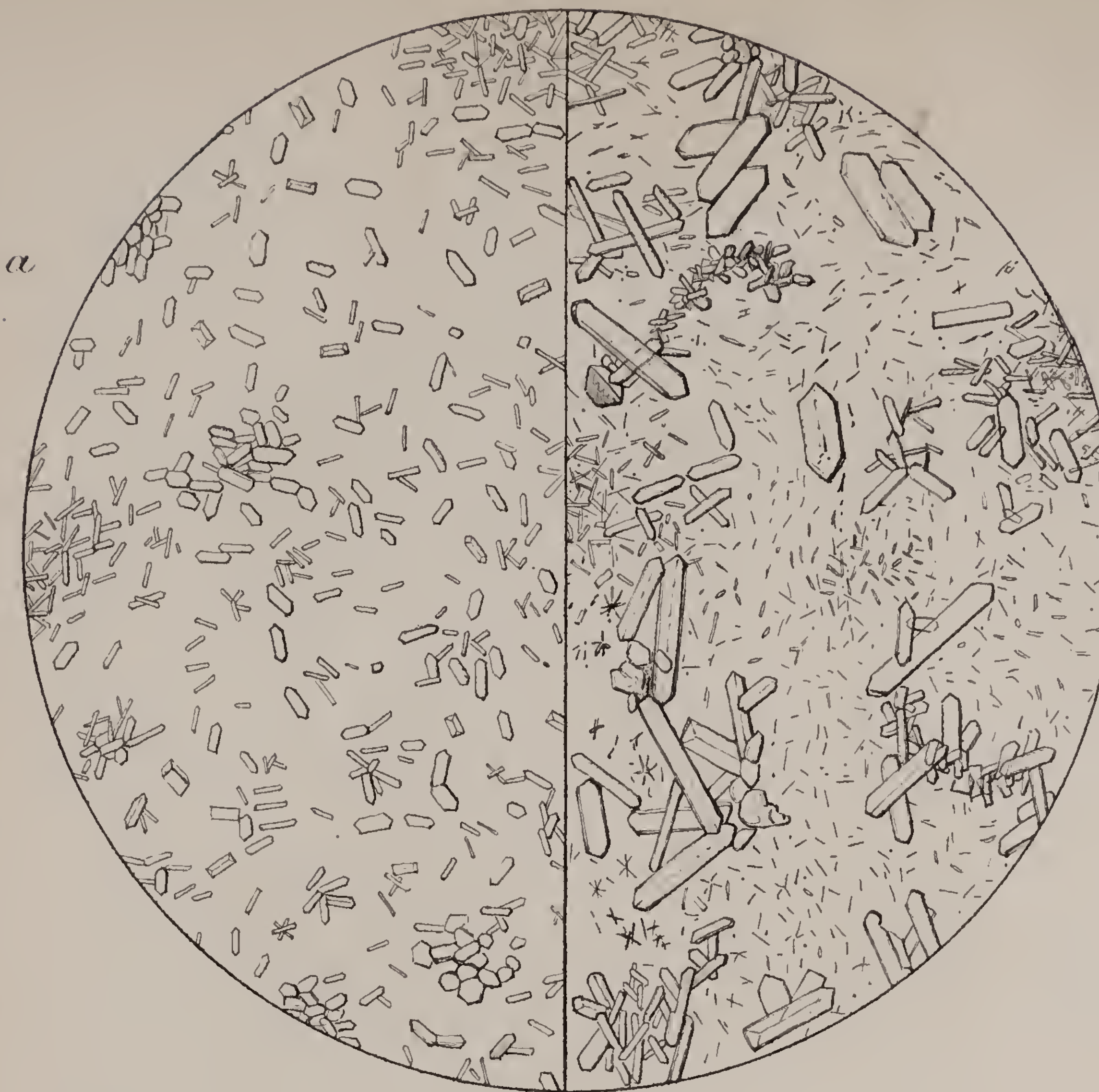
LIQUOR OPII SEDATIVUS.
(TURKEY OPIUM.)

PLATE 3.

FIG. 1.

FIG: 2.

a



b

FIG. 3.

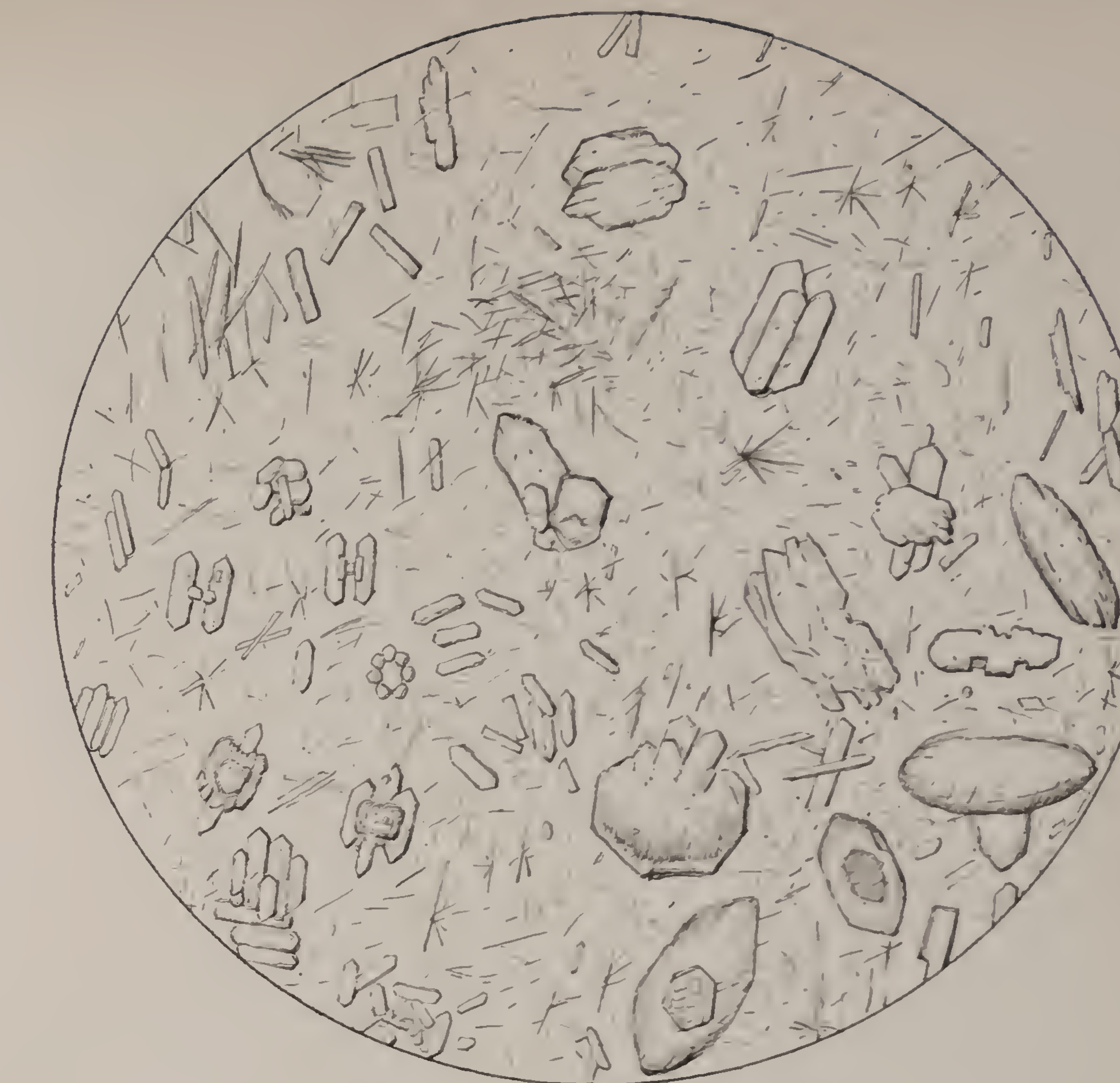


FIG. 4.

FIG: 5.

FIG: 6.

H B Brady del ad nat.

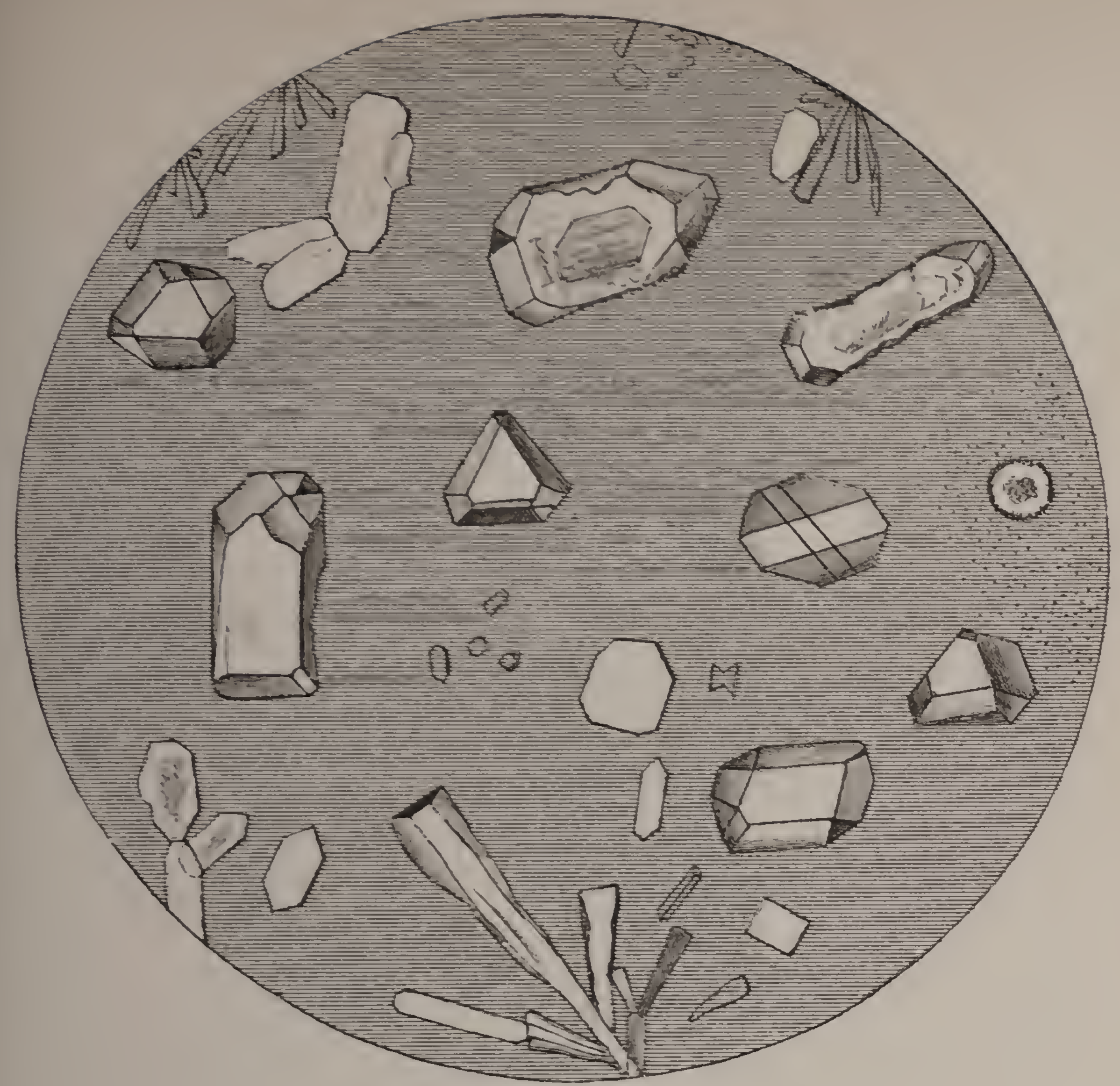
Tuffen West, sculp.

W West imp.

PLATE .4.

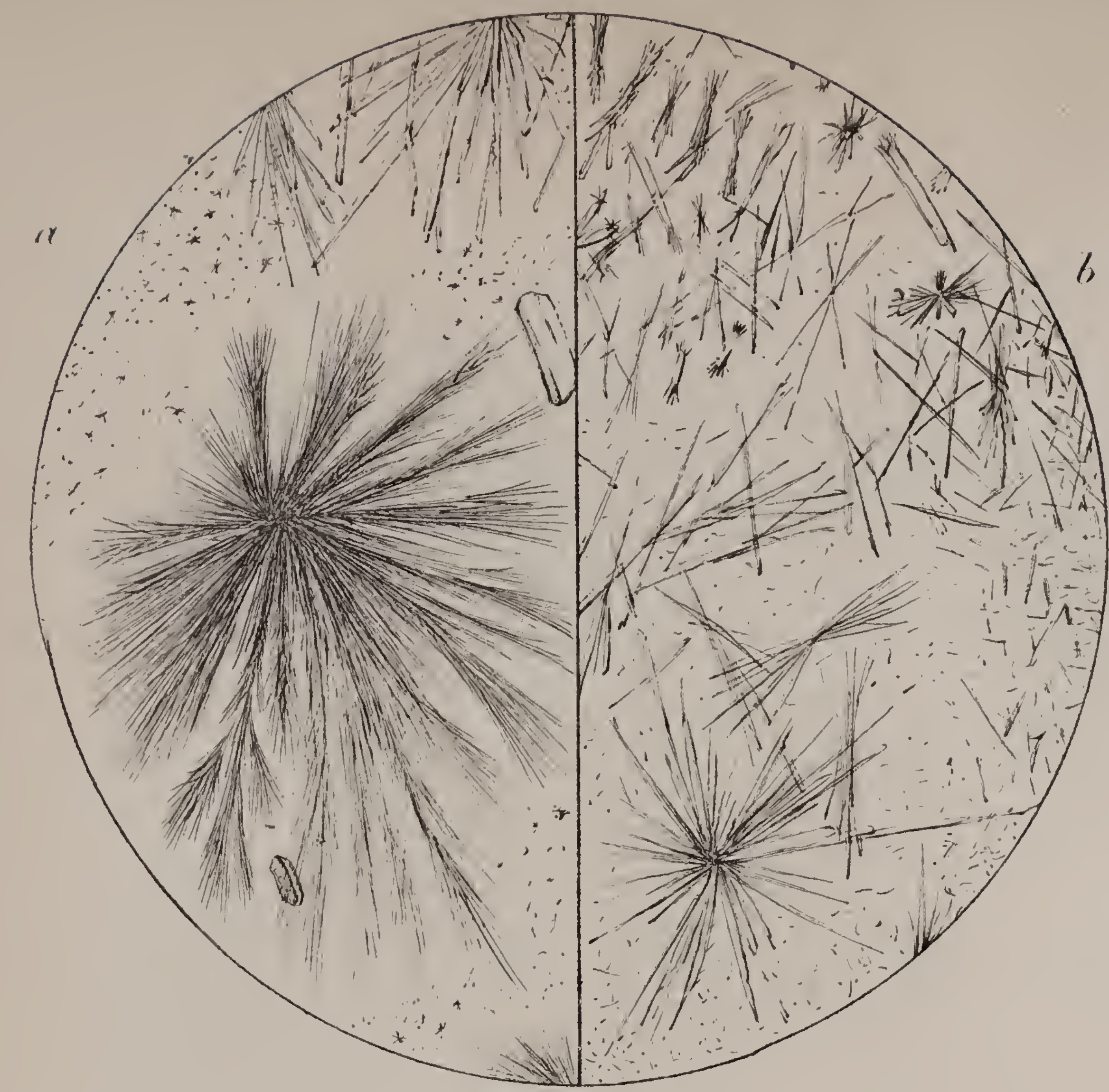
EXTRACTUM OPII.

FIG: 1.



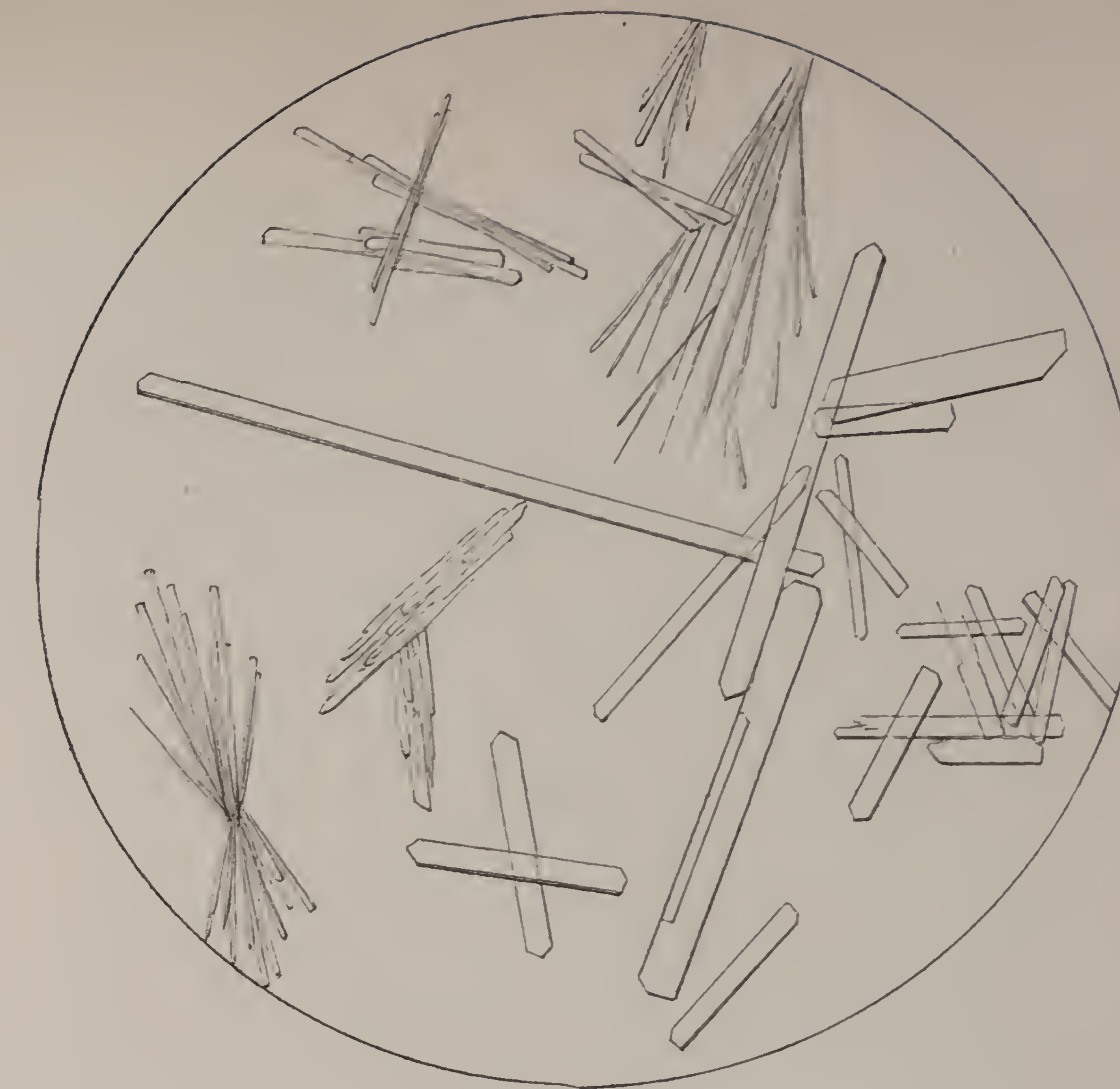
PATNA.

FIG: 2.



MALWA.

FIG: 3.



PERSIAN.

TINCTURA OPII.

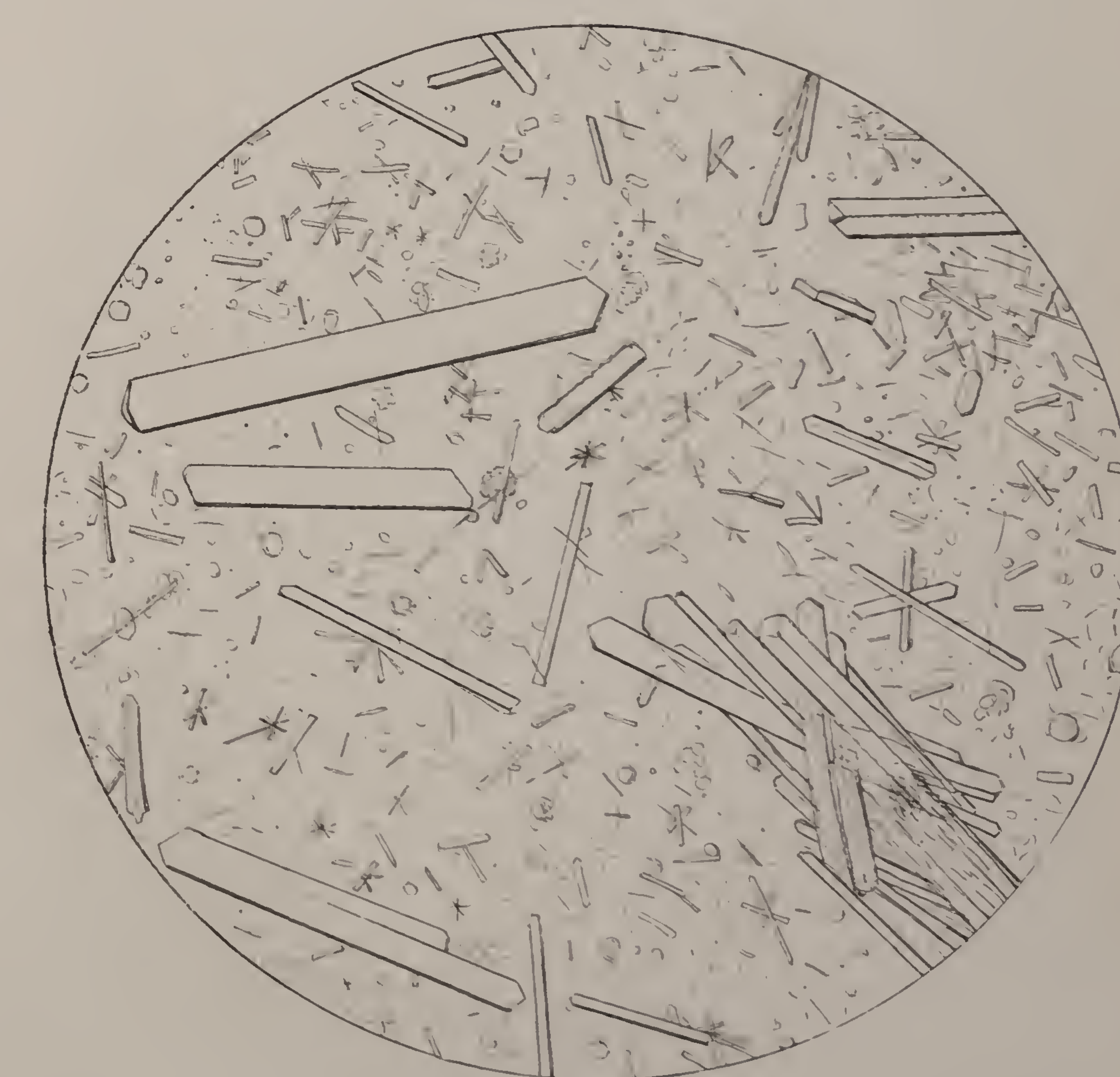
FIG: 4.

PATNA.

FIG: 5.

MALWA.

FIG: 6.



PERSIAN.

H.B Brady, del ad nat

Tuffen West sculp

W. West, imp.

REPORT ON THE PURITY OF SULPHATE OF QUININE OF COMMERCE.

BY MR. W. WALTER STODDART.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

Probably quinine is one of the most important therapeutic remedies for the ills of the human body that has ever been introduced to the notice of the medical man; so extensively is it used, and with such certainty may its effects be calculated, that no other substance can be advantageously substituted. Yet this very circumstance unfortunately gives the temptation for frauds and adulterations so commonly said to be practised by unprincipled dealers.

The smallness of the dose with which quinine gives such remarkable results, renders any sophistication all the more dangerous, and disappointing to the physician; indeed, the very turning-point of an illness may be frequently dependent on the purity of a sample of quinine.

It is not by any means to be supposed that any suspicion is attached to the high respectability and probity of the well-known manufacturers of quinine. Existing adulterations, properly so called, such as the deliberate addition of salicine, sugar, boracic acid, quinidine, cinchonine, etc., are only made by second or third-rate dealers, or when it has passed through the hands of a third or fourth party. Such samples may still be found in shops situated in secluded parts of the country or lowest streets of a city, and traceable to the same origin.

On the other hand, probably from difference in the mode of preparation or separation of the cinchona alkaloids, quinine differs much from the presence of its isomeride quinidine. The latter is often, if not always associated with quinine in the natural state, and has many of its reactions exactly similar, besides being nearly as soluble in the usual menstrua.

It therefore becomes to a certain extent a natural mixture, and in proportion to the completeness of the extracting process, so will be the purity of the product. Opinions, it is true, vary greatly as to whether quinine and quinidine differ in their medicinal power, and therefore some may say that the presence of the latter (quinidine) is of no consequence; this, however, is not the question at issue, and the points of this report are strictly confined to the commercial purity of quinine and its freedom from the cheaper salts.

In carrying out this object the desired results are threefold:—

First, *Qualitative*, or to find an easy and reliable test for the presence of the three most common cinchona alkaloids, quinine, quinidine, and cinchonine.

Secondly, *Quantitative*, to find the most practical and reliable mode of separating and estimating these alkaloids; and,

Thirdly, an application of the above to the examination of the sulphate of quinine as made by the principal manufacturers.

Although the cinchona barks contain many alkaloids, only four occur in sufficient frequency and quantity to merit notice in a commercial investigation, quinine, quinidine, cinchonine, and cinchonidine. In actual practice the two last may be estimated together.

The most prominent impurity in quinine is quinidine; in none of the aftermentioned samples was cinchonine discovered in any quantity except one. The slight solubility of the cinchonine salts as compared with those of quinine and quinidine, and the boldness of its crystallization would, to the practised eye, soon lead to its detection; experiments will easily show the truth of this, and that quinidine and not cinchonine must be generally sought as the chief impurity in commercial sulphate of quinine.

Notwithstanding tests for the purity of quinine are so numerous and in some instances so trustworthy, still few apply to the *separation of quinidine* from quinine; nearly all are proposed for the indication of quinine only, or its detection when mixed with other substances.

The polariscope tests of Bouchardat and Pasteur, and the fluorescent test of Professor Stokes, require too much study and practice to come into general use for qualitative analysis among manufacturers and retailers.

The same remarks apply to the exquisitely beautiful experiments of Dr. W. B. Herapath. It is quite true that to the expert the iodine test will detect the presence of a very minute portion of quinine, quinidine, or cinchonidine, yet it requires considerable experience with an expensive polarizing microscope, with great consumption of time, to give good results, when only a minute quantity is operated on.

The chlorine and ammonia test of Brande, and the chlorine test of Pelletier, will not distinguish always between quinine and quinidine.

The presence of so much water and ammonia is detrimental to the British Pharmacopœia test, which is anything but a good modification of Liebig's original one.

From these remarks it will be apparent that a good qualitative test for detecting the several cinchona alkaloids in an unknown mixture is a desideratum. From a considerable series of experiments it appears that these conditions may be amply fulfilled by either of the two following methods.

The first is a modification of that proposed by Liebig.

Into a glass tube or bottle put ten grains of the suspected salt, dissolve in ten minims of dilute sulphuric acid and 60 minims of distilled water; to this add 150 minims of *pure* sulphuric ether, three minims of alcohol, and 40 minims of a solution of hydrate of soda (1 part to 12 parts). Agitate well and lay aside for twelve hours, when if the slightest trace of quinidine, cinchonine, or cinchonidine be present, they will be seen at the line of separation between the ether and solution of sulphate of soda.

If only a small percentage of quinidine be present, it will appear as an oily substratum, appearing under the lens as dust from the minuteness of its particles. Cinchonine will appear more decidedly crystalline. With a little practice, the eye will easily distinguish which of the alkaloids is deposited.

This will detect a much less quantity of quinidine than the Pharmacopœia test. In the latter the ether dissolves a greater portion of the quinidine, while the dilute ammoniacal solution of sulphate of ammonia is an actual solvent unless great care be taken to add no more ammonia than will exactly precipitate the alkaloids, which is often difficult and tedious.

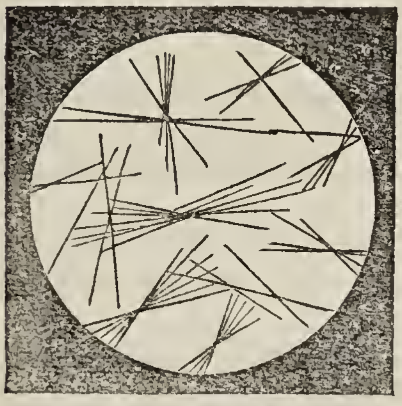
The second method proposed is the one most generally used by the author, and which is perhaps the easiest and most trustworthy of any hitherto submitted. The reagent is sulphocyanide of potassium.

Into an ounce of distilled water drop ten drops of dilute sulphuric acid (British Pharmacopœia $\frac{3}{35}$). To this add 14 grains (or as much as will saturate the acid) of the suspected salt. Filter through paper, and to a little of the filtered solution add a few drops of the solution of sulphocyanide of potassium (180 grains in $1\frac{1}{2}$ ounces of water). An immediate precipitate of the several alkaloids takes place, each of which, as seen by the sketches, is distinct and characteristic.

If quinine, quinidine, and cinchonine be present they will all be seen on the slide distinct from each other, becoming more so every minute.

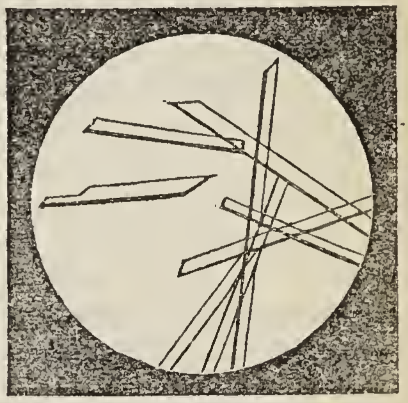
A very good plan is to place a very small drop on a glass slip and to put another of the sulphocyanide by its side. Over both place a piece of thin glass, which will cause the drops to touch. Examine the line of junction under a quarter-inch lens, when the crystals are seen and may be readily recognized. By this method $\frac{1}{10000}$ of a grain of quinidine or cinchonine may easily be detected.

It is very interesting to see the particles all arranging themselves into the respective groups; the long slender needles of the quinine salt, the round crystalline masses of the quinidine, and the large well-formed prisms of the cinchonine



Sulphocyanide of quinine.
(450 diam.)

Sulphocyanide of quinidine.
(450 diam.)



Sulphocyanide of cinchonine.
(450 diam.)

salts. So remarkably constant is this reaction, that an observer who has once been accustomed to the general appearance can at once say with ease, this is quinine, this quinidine, and that cinchonine.

Sulphocyanide of potassium is not usually kept by druggists, but may readily be made thus:—

Cyanide of potassium (fused),
Sublimed sulphur, of each 120 grains.
Distilled water, an ounce and a half.

Boil in a glass flask for fifteen minutes, filter, and make up the quantity to $1\frac{1}{2}$ ounces with sufficient distilled water.

This notice of the qualitative analysis ought not to be passed without mentioning a very good application of Professor Stokes's fluorescent test for the discovery of quinine and other substances possessing the property of epipolism.

A small Geissler's vacuum tube is surrounded by a longer glass tube which is capable of being closed by a cork, an arrangement that permits the tube to be filled and emptied as an ordinary phial bottle. When any bark is suspected to contain quinine, etc., an acid or alcoholic infusion is put into the outer tube, and a spark from the Ruhmkorff's coil passed through. Instantly the fluorescent salt, whatever it may be, will show its presence in the most gorgeous manner.

By this method twenty-seven samples of barks were qualitatively tested in a couple of hours that were supposed to contain a new alkaloid, which occurs in an Australian tree possessing very peculiar fluorescent properties.

The process most applicable for the quantitative analysis of sulphate of quinine is that by means of the iodide of potassium reaction, recommended by Dr. De Vry some time since. The following was the arrangement employed in the present instance:—

Into a tube containing 120 minims of distilled water and 16 minims of dilute sulphuric acid (British Pharmacopœia), add twenty grains of the sulphate of quinine to be tested. When dissolved add 80 minims of solution of hydrate of soda (1 to 12) and 300 minims of *pure* sulphuric ether mixed with six minims of alcohol.

Agitate well, and lay aside for twelve hours; decant the ethereal solution and evaporate for the *quinine*. To the remaining aqueous solution add just sufficient acetic acid to neutralize the alkali, and precipitate with solution of iodide of potassium (1 to 4), filter, dry, and weigh the hydriodate of quinidine. One hundred grains of this salt contain 71·68 of pure *quinidine*. To the filtered solution again add hydrate of soda till decidedly alkaline, when the cinchonine and cinchonidine will be precipitated if present.

It was according to the above-mentioned process that the following samples of quinine were analysed. The first was taken from a four-ounce bottle from Messrs. Howard's and Sons, Stratford.

On submitting it to the soda and ether test there was no appearance of cinchonine, but beneath the ether was an oily substratum, which by the usual tests was proved to be quinidine.

The quantitative analysis showed this to amount to 2·8 per cent. After the separation of the quinidine the soda gave no precipitate, proving the absence of cinchonine and cinchonidine. Consequently this was an extremely pure sample of sulphate of quinine.

The next sample tested was quinine from the laboratory of De Lisle and Co., Paris, better known as "Pelletier's quinine." This yielded 4·1 per cent. of quinidine, and the soda gave a trace of cinchonine.

The third sample was from the chemical works of Mr. Jacob Hulle, Lombard Road, Battersea. This contained 5·6 per cent. of quinidine and ·8 per cent. of cinchonine and cinchonidine.

The unbleached variety of the same maker was, as may be expected, much less pure than any of the above.

The sample examined contained 16·3 per cent. of quinidine and 4·2 per cent. of cinchonine and cinchonidine. All these were taken out of bottles unopened and sealed by the manufacturer.

With neither was there any precipitate with nitrate of silver and nitric acid, proving the absence of muriate of cinchonine; neither did strong sulphuric acid produce any tinge except the usual pale yellow tint.

A quinine has lately been introduced by Messrs. Herring and Co., Aldersgate Street, under the name of "semicrystallized quinine," but as it does not profess to be pure sulphate of quinine, but a compound of *all* the alkaloids of the yellow cinchona bark, it ought by no means to be used by the dispenser as a substitute for quinine without the sanction of the prescriber. The same remark applies to the unbleached variety of Mr. J. Hulle.

A sample from Germany was also examined and found to be exceedingly impure, but as it was not an original package, and without any name, it was thought inexpedient to bring it before the notice of the members of the Pharmaceutical Conference. It is very gratifying to be able to affirm that sulphate of quinine, if purchased in bottles or sealed packets, as sent out by the makers, or obtained through our well-known wholesale houses, is commercially pure and quite fit for medicinal use.

It must be the chemist's own fault if he is imposed upon and not supplied with an article of sufficient purity.

Bristol.

ON COMMERCIAL PODOPHYLLIN.

BY MR. JAMES SPEARING.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

Podophyllin is a resinous principle existing in the rhizome of the *Podophyllum peltatum* (the American mandrake or May-apple), a creeping perennial, growing wild in the States of North America, and belonging to the Natural Order *Ranunculaceæ.*

It occurs in commerce in the state of powder, varying in colour from light-yellow to dark-brown, according to the degree of heat employed in the preparation. In taste it is nauseously bitter and acrid, and it possesses a peculiar narcotic odour. Three processes for its production have been published, viz.:—

I. A process by Messrs. F. D. Hill and Co., of Cincinnati.* "Exhaust coarsely-powdered mandrake-root with alcohol by percolation. Place the saturated tincture in a still, and draw off the spirit; the residue will be a dark fluid of the consistence of molasses. Warm the thick residual liquor, and slowly pour it into three times its volume of cold water, which must be constantly agitated during the process. Allow it to stand twenty-four hours, then collect the precipitate on a linen filter, and wash several times with water. After this, place it in thin layers on paper, and dry in a room of a temperature between 65° and 90° F., or, if in summer, at the natural atmospheric temperature."

II. The process of the 'British Pharmacopœia,' also published by Messrs. Hill,† differs from the above only in the addition of $\frac{1}{24}$th part of hydrochloric acid to the water by which the podophyllin is precipitated.

III. Consists in shaking together a concentrated tincture of the rhizome and a saturated solution of alum, and collecting, washing, and drying the precipitate, as previously described.

To ascertain the comparative value of these processes, a concentrated tincture of *Podophyllum* was prepared by percolation, and divided into three equal portions. Each portion was precipitated in accordance with one of the above methods, and with the following results:—No. 1 yielded 2·7 per cent. of podophyllin; No. 2, 4 per cent.; and No. 3, 2½ per cent. The two former were almost entirely soluble in alcohol (the best solvent of podophyllin‡), whilst the latter contained 7 per cent. insoluble in that menstruum.

By adding hydrochloric acid to the water in which No. 1 was precipitated (after the podophyllin had been filtered out), silky crystals separated; whilst the water from No. 2, treated in a like manner, remained clear. These crystals are said to be hydrochlorate of berberia,§ to the presence of which the activity of podophyllin is by some partially ascribed.

From the foregoing it will be inferred that the process of the 'British Pharmacopœia' gives the most satisfactory result.

In order to estimate the purity of commercial samples, solubility in alcohol was taken as the standard. Samples obtained from eleven different sources were thus examined, and showed a degree of insolubility varying from 2 to 8 per cent. Of these samples, the residues of five, first calcined and then treated with dilute hydrochloric acid, and tested in the usual way, yielded a trace of alumina. The residue of two others, treated in the same manner, yielded iron, and one copper. The remaining three gave no metallic precipitate.

From the preceding, coupled with the fact that from podophyllin prepared by process No. 3, 7 per cent. of matter insoluble in alcohol was obtained, which, on further examination, showed a trace of alumina, it is inferred that commercial podophyllin, though comparatively a pure article, is far from uniform in its nature, and that process No. 3 is most generally adopted for its preparation, though some other astringent metallic salt is occasionally substituted for the alum. It seems desirable that the new Pharmacopœia process should be more generally employed, as it certainly appears to give the most satisfactory and definite preparation.

338, *Oxford Street, London.*

A CHEMIST'S HOLIDAY:—JOTTINGS IN FRANCE.

BY DANIEL HANBURY, F.L.S.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

Many of us when boys must have read with delight the charming little tale

* Parrish's 'Practical Pharmacy,' p. 191. † Ibid.

‡ Bentley, 'Pharmaceutical Journal,' 2nd series, vol. iii. p. 460.

§ Attfield, 'Pharmaceutical Journal,' 2nd series, vol. v. p. 632.

called *Eyes and no Eyes*,* in which the narration of a country walk is made the occasion of showing how an observant mind may derive instruction and pleasure from objects which in the non-observant excite no interest.

As I have neither been able to accept one of the subjects proposed by the Pharmaceutical Conference for investigation, nor to take up any other, and am yet unwilling to appear before you empty-handed, I am compelled to the expedient of producing my essay from the same kind of materials that afforded the narrative of "*Eyes;*" and will therefore read you a few memoranda bearing as far as may be on pharmacy, made after a month's ramble among the Alps of Dauphiny.

Leaving London in the latter part of July, in company with a friend, I spent two days in Paris, visiting while there the École de Pharmacie, which, I need hardly remind you, is an establishment of ancient growth, and is much more extensive than our own school in Bloomsbury Square. Besides museum, laboratories, etc., it possesses a small botanical garden, which is overlooked by the residence of the veteran pharmacologist, Professor Guibourt, Lecturer on the Natural History of Drugs. The professor's private collection is very extensive, and occupies several small rooms in the upper part of a house in an adjoining street, where we had the pleasure of meeting him, as well as Professor Planchon of the School of Pharmacy at Montpellier. I may remind you that Paris, Strasburg and Montpellier are the centres of French pharmaceutical education, these three cities alone possessing Superior Schools of Pharmacy.

We next visited the Jardin des Plantes, which is not distant from the École de Pharmacie, and spent some time in inspecting the zoological and botanical collections in the museums. In the garden itself, I observed in a sheltered situation against a wall a fine pistachio-tree, with nuts of full size, produced, I was informed, after artificial impregnation, the male tree growing at some distance. Conducted by M. Naudin, we also examined some of the rare *Cucurbitaceæ*, for which the garden is famous, as well as a series of beds in which curious experiments on the hybridization of plants were being carried on. A call at the busy establishment of Dr. Mialhe, pharmacien to the Emperor, and a brief visit to the large and bustling wholesale house of M. Dorvault concluded all that could be called *pharmaceutical* in my visit to Paris; and I shall therefore pass at one jump to the Grande Chartreuse, that famous monastery near Grenoble, founded by St. Bruno in the eleventh century, and of which our London *Charterhouse* was originally a branch. I need not here tell of the magnificent alpine scenery amid which the monastery is situated, nor of the austere habits of the monks, nor of the primitive style of bed and board, with which visitors to the establishment are entertained. But I wish to relate to you the beneficial effect to the institution of a little pharmaceutical knowledge.

Previous to the French Revolution of 1789, the convent had large landed possessions, all of which were confiscated during that convulsion, and the monks expelled for a period of over twenty years. However in 1816, the Grande Chartreuse was restored to its owners, but without the restitution of its lands,—the only privilege allowed being the right of pasturage and of cutting wood in the circumjacent forest. But the monks had another resource: they made some excellent cordials and an elixir of wonderful virtue, both distilled from the aromatic plants growing on the alpine pastures. They invented also a tooth-tincture, and a certain preparation of iron, known under the name of *Boule d'acier;* and these have become sources of revenue almost equal in value to the houses and lands lost by the Revolution. The liqueurs

* By Dr. Aikin and Mrs. Barbauld.

or cordials, in particular, are in universal demand, and bring an income, it is said, of nearly £20,000 a year. The composition of these liqueurs, of which there are three kinds, the green, the yellow, and the white, is not known. Balm, wormwood, a small pink, and the buds of a fir, are said to be ingredients, but there are probably several others,—among which I could fancy, judging from the taste of the yellow liqueur, there might be *Astrantia* and *Meum*, both common plants in the meadows round the Chartreuse.

The subalpine woods of this part of Dauphiny produce the Spruce Fir (*Abies excelsa* DC.), the source of genuine Burgundy Pitch, which however is not collected, though it easily might be, as one sees it streaming from the tree-trunks on all sides. The Silver Fir is also common: it yields, I may remind you, the rare and fragrant Strasburg Turpentine, once officinal amongst us, under the name of *Terebinthina Argentoratensis*. This turpentine is obtained by puncturing small swellings in the bark of young trees, and allowing the single drop of clear turpentine which exudes from the puncture, to run into some small vessel held below to receive it. The Scotch Fir is also found in some districts, and what is remarkable, the common mistletoe grows upon it, in preference it would almost seem, to the apple-trees which are sometimes in near proximity.

The common Colchicum, I noticed in many places throwing up its purple flowers among the green herbage of orchards and meadows;—and in a few alpine situations, I also gathered *Colchicum alpinum* DC., a species with flower and corm of much smaller size.

Actæa spicata L., a rare plant in England, is found in the mountain woods near Bourg d'Oisans; and its root which I dug up and dried, is so like that of the American *Actæa racemosa* L. that I do not think one could distinguish them.

Our English Foxglove was nowhere seen in Dauphiny, but the yellow *Digitalis grandiflora* All., and the small white-flowered *D. lutea* L. were of frequent occurrence. Henbane, I often noticed, especially near Briançon, where it was very fine by the roadside.

Lavender,—the genuine plant of our English gardens, is very abundant in some parts of the country, growing in profusion on the rocky hillsides, but no use appears to be made of it. Many other beautiful labiates are also seen, of which Hyssop, with its bright blue flowers is one of the more rare. The great yellow Gentian was nearly past flowering at the time of my visit, but it was still conspicuous in many an alpine pasture, as was also the white Hellebore (*Veratrum album* L.), a plant affecting similar situations. *Arnica montana* L. was also nearly out of flower, but it must be a splendid ornament of the mountain meadows in the earlier summer. In many of these meadows, I may mention that grass seems quite a subordinate constituent, so thickly is the ground covered with other plants.

Proceeding to Briançon, that little mountain city on the confines of Italy, we were struck with the appearance of the numerous small trees of the Briançon Plum (*Prunus Brigantiaca* Vill.), the branches of which were often thickly clustered with fruit, still far from ripe. The tree is indigenous to this part of France and is not an object of cultivation. Its fruits, which are hardly eatable, are gathered in the autumn for the sake of their kernels, which yield by expression a fatty oil, considered by the peasants a useful medicine both for man and beast. I bought some of it, and found it to have an agreeable flavour and a slight odour of bitter almonds: further than that it was "*très-bonne pour la colique*," I could not gain any very definite idea as to its virtues.

Briançon, however, has another pharmaceutical interest, in the *manna* which old writers relate is, or can be, collected from the larches that grow in its vicinity. The larches certainly are there, and very interesting it is to see them growing truly wild on their own native mountains.

During a visit to Briançon in June 1857, I made particular examination of the larches on the neighbouring hills, and obtained so little evidence of anything like saccharine exudation that I was ready to conclude the formation of such a substance must be of rare and exceptional occurrence. Subsequently to this however, M. Berthelot of Paris actually made a chemical examination of Briançon Manna, and demonstrated it to contain a peculiar variety of sugar, which he designated *Melezitose,* a name derived from *melèze,* the French for *larch.*

Here again in the country of the larch and in the very classical locality for the manna, it was necessary of course, to renew the previous fruitless research,—and my travelling companion felt equally interested in the inquiry. A day or two before we reached Briançon, we had examined larches at La Grave a few miles distant, but not a trace of saccharine exudation could we discover. There was a little white aphis on the leaves of several trees, just as one often sees upon the larch in England; and upon examining the insect carefully, once could perceive a minute globule attached to one part of it. Was this the manna? or had it anything to do with it? Here was a globule of something, but too small to collect, or even to taste *per se*:—still in our desperation we licked the aphis-covered leaves, and fancied they had a faintly saccharine taste. The cones certainly had an exudation, but it was turpentine to all intents and purposes,—fine clear drops of genuine Venice turpentine;—and a botanist of Briançon assured us a day or two after, that this was the manna. As I could not however believe that M. Berthelot had mistaken turpentine for sugar, I commenced making further inquiry and fortunately applied to M. Turin, an intelligent pharmacien, who at once assured me that Briançon manna was no myth, but a saccharine substance to be actually found on the foliage of the larch. M. Turin stated that in the height of summer and in the early part of the day, the larches in the forest (or at least some of them,—I did not understand the remark to apply to all) were really whitened with the manna, as if there had been a sprinkling of snow,—a thing remarked the worthy pharmacien that was "vraiment belle à voir." M. Turin further added that the manna had nothing in common with turpentine, or with the aphis we had noticed on the leaves. In reply to my eager inquiry, if there was still a chance of seeing the manna *in situ,* and what locality for it was most accessible, M. Turin directed us to the village of Chantemerle, near which there was a mountain abounding in larches, and added that on some of them it was possible we might still find the manna. Though we had engaged to leave Briançon at an early hour, we determined first to make the expedition suggested by M. Turin, and accordingly drove to the village of Chantemerle, near which we found larches in abundance, but manna was not equally obvious. A careful search however of the foliage of the trees revealed here and there a little tear of white sugary matter, encrusting the needle-like leaves. This was all the ocular evidence of manna we could obtain; but on returning to the village, an old peasant whom we accidentally met, assured us that it was useless to search for the manna except in the cool of the morning, and that moreover, the season for finding it was almost over. He promised however to speak to the shepherds on the mountain, and obtain through them a little of the substance, if any could still be found. The old man kept his word, and through him I received at Grenoble a fortnight afterwards, a good specimen of the Larch Manna, a portion of which I have now the pleasure of exhibiting.

Seeing my interest about the manna, the old peasant asked me if I knew what he called *Génipi;* and on my professing ignorance, he ran home to get some. It turned out to be an *Artemisia*, which is collected on the mountains, and held in high estimation as an aromatic bitter.

Another production of the same neighbourhood is a sort of talc, once officinal under the name of *Craie de Briançon*, but now chiefly used as "Boot Powder," and for taking out greasy stains.

Near Briançon, the common gooseberry occurs very plentifully in a wild state. Its fruit though not larger than a pea, and rather hard and bristly, has an excellent flavour, and the plant is doubtless the progenitor of the gooseberry of our gardens. It is rather curious how many other of our fruits may also be noticed in this part of France, either wild or semi-wild. The vine, apple, pear, medlar, quince, raspberry, cherry, and two species of currant are all to be seen in greater or less abundance. The currants however are specifically distinct from our garden *Ribes*. In the alpine meadows the chive (*Allium Schœnoprasum* L.) is very frequent, and in August its pink flowers are ornamental among the green grass. In England it is only known as a potherb, which is also the case with savory (*Satureja montana* L.), which I found on the dry hills of the Val de Queyras. In this valley I also gathered savine, which I had previously seen nowhere else. Here however it is very plentiful, covering the rocks with a scrubby vegetation, and diffusing slightly its characteristic odour.

Dauphiny abounds in mineral wealth, including that most precious of all minerals, coal. It also posseses several medicinal springs, that of Uriage, six miles from Grenoble, being the most frequented. The water is sulphuretted alkaline, issuing from its source slightly warm. It is both drunk and used for baths. There is also at Uriage a ferruginous spring, the water of which is brought to the table d'hôte in decanters and drunk with wine by those who require a mild chalybeate tonic.

These, Gentlemen, are the pharmaceutical memoranda of my pleasant ramble, which came to a conclusion soon after I left Uriage. I have offered them to you in default of a grave and learned paper, and hope they may have afforded, if not amusement or instruction, at least a proof of my interest in the welfare of the British Pharmaceutical Conference.

ON THE RANCIDITY OF FATS.

BY THOMAS B. GROVES, F.C.S.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

Some experiments relative to the action of certain odorous principles in preserving the neutrality of fats, commenced in December, 1861, and not yet reported on, would, I thought, form the basis of a paper on the above interesting subject.

To the invalid who suffers from applying to an inflamed surface an irritant instead of emollient substance, as well as to the pharmaceutist who sustains pecuniary loss from the spoiling of his ointments by rancification, the question is doubtless important.

Rancidity may be defined as the changed condition, assumed sooner or later by all natural fats exposed to air and moisture, such change being characterized by loss of blandness and neutrality and development of pungency and acidity.

The cause of change being hidden or at best imperfectly understood, the change has been termed spontaneous, or classed among those determined by catalytic influence. Chemically speaking, it consists in the separation of the neutral fat into its components, fatty acid and glycerine,—the latter substance almost invariably accompanied by obscure products of decomposition of an offensive and noxious character.

Palm oil is, I believe, the only fat that has been observed to separate *distinctly* into acid and glycerine.

It will throw much light on the nature of the change if we carefully watch its progress from the first appearance until the full development of rancidity.

That is done with most ease in ointments containing colouring matter of a vegetable origin, such as savine, or mineral, as oxide of mercury; but in pure lard it is not difficult.

The best chemical test of rancidity I find to be iodide of potassium, which when mixed with fat in the least degree affected, quickly assumes an orange colour, indicative of the presence of free iodine, the tint being directly proportional to the amount of rancidity. Thus I have found that when added to fat extremely rancid, the coloration is intense and immediate; when added to mixtures of this fat and other perfectly neutral, the coloration is less and less according to its dilution, and is plainly perceptible when the fat contains only one-twentieth, but a longer time is required for its development.

Acidity cannot be relied on as the index, for it will be found, that whereas the highly rancid fat, when boiled with alcohol, yields a solution reddening decidedly, though not promptly, litmus-paper, a mixed fat, such as the above, gives a negative result.

When rancidity first shows itself in a pot of lard that has been filled with the melted fat and not subsequently disturbed, the following phenomena may be observed. Here and there throughout its contents, but more especially at the points where the lard touches the sides of the stoneware jar, small patches of a whiter and more crystalline aspect than the bulk have made their appearance. If these patches are tried by iodide of potassium, they will be found to be highly rancid, whilst the surrounding parts retain unimpaired their original freshness. As the process advances, these patches increase in size and number, until the whole mass has become infected. How far the action would proceed if time were given it is uncertain, but ordinary cases of rancidity are caused by the splitting up of a small portion only of the fat. From the change taking place in situations to which the air cannot be supposed to penetrate,—for instance, the interior of a homogeneous mass of fat,—it may be inferred that air is not necessary to its *propagation*. Analogy coupled with the observation that rancidity first makes its appearance at the sides of the vessel, where possibly from contraction during cooling a small air-space may have been left, point to the necessity of air being present at its *commencement*. In fact, it is pretty sure that the phenomena are caused by a species of fermentation involving the joint action of air, water, albuminous matter, and a moderate degree of heat. Such is the opinion of M. Pelouze, who has written much on the question, and of whose valuable labours I have freely availed myself.

There can be no question of the presence of water in all natural fats; albuminous matter in some form may also be safely assumed to be in company with it. It is often met with in a flocculent form at the bottom of jars of olive oil, and cannot fail to be present in all fats of animal origin, whilst MM. Saussure and Pelouze have noted the absorption of oxygen during the drying of siccative oils, some of which in return evolve hydrogen and carbonic acid. I have myself observed a candle lowered into a jar partly filled with cod-liver oil, that had remained some time in contact with the air in the upper part of the vessel, suddenly extinguished. It is doubtless true, on the supposition of a ferment being the agent that effects the disturbance, that the removal of any one of the essential conditions would prevent its action. But can it be done in a practical way? I believe not. To remove the last trace of *humidity* would be impossible, except by tedious and expensive methods. Still a partial drying is better than none, and the experience of housewives is unanimous on the point as regards the melting of lard, which they say will not keep unless it has been made to boil. *Albumen* has been sought to be removed by agitation with sulphuric acid of 40° Beaumé, washing with water and subsequently drying. The process was employed some years ago in preparing rape oil for burning in lighthouses, and was found to hinder its oxidation. I have not been able to imagine an *easy* process for freeing oils, etc., of this dangerous ingredient, and have therefore made no experiments in that direction. M. Pelouze made many attempts to insulate the body, but failed. Nevertheless he was able from its effects to identify it as one of the albuminous series. I shall be able to show, further on, that its activity may be effectually neutralized by a simple method. The entire exclusion of *air* is of course practically impossible.

The length of time required for the development of these changes makes experimenting very tedious, and renders one unable to do so much in a given time as one could wish. I have therefore confined myself within very narrow limits, relating to practical remedies only, and to Lard as the base of experiment.

Shortly after the use of benzoinated lard had been recommended for the preparation of zinc ointment, which it is well known to preserve against rancification, I applied with success the same idea to other ointments of similar composition, viz. those containing metallic oxides, whose presence had been found to act unfavourably on the keeping qualities of the fats with which they were associated. These were calamine cerate and oxide of mercury ointment. I have found that M. Deschamps, in 1843, recommended the same proceeding in making oxide of mercury ointment, and also the ointments of iodide of potassium and acetate of lead. For ointment of tutty and blue ointment, where a little extra colour would not be objectionable, he directs the use of "graisse populinée," the keeping qualities of which are really extraordinary. M. Deschamps states that whilst the "graisse benzinée" will keep good for one year, the "graisse populinée" will keep good for an unlimited time. He suggests its use for greasing machinery even. I intended to make some of this preparation, but could not get the poplar buds. The French perfumers, in preparing the base of their pomades, adopt a process somewhat similar, viz. digestion with benzoin after a preliminary washing, and boiling with solution of salt and alum. Their method yields a stable fat, but it is too troublesome to be frequently performed, and succeeds best on the large scale,—consequently is not well adapted for the pharmaceutist.

For experiment on the nature of the preservative power exercised on fats by bodies like benzoin, the oxide of mercury ointment was evidently well adapted, as the progress of rancification is marked by alteration of colour—the oxide being reduced *pari passu* with the oxidation of the fat.

It was my impression that the essential oil had more to do in the matter than any other constituent of the gum, though it had been asserted that benzoic acid answered equally well. But the acid of commerce contains an abundance of the odorous principle.

To test the truth of the surmise, and at the same time ascertain what degree of effect, if any, was produced by various essential oils, I prepared, on Dec. 5th, 1861, a quantity of red precipitate ointment, using ordinary lard and wax in the prescribed proportions, and a smaller quantity using benzoinated lard. To small portions of the former I added essential oils, in the proportion of 4 drops to the ounce. The oils I used were fennel, almond, bergamotte, cassia, turpentine, lavender, neroli, lemon, rose, rosemary, caraway, nutmeg, savine, pimento, cumin, clove, and sassafras. I also tried creasote, balsam of Peru, Venice turpentine, and powdered guaiacum. These were all put into willow boxes, and, in order to hasten the reaction, placed in a warm situation, whose temperature ranged between 70° and 80°.

On the 28th of the following February (85 days), I observed the ointment made with plain lard to be slightly discoloured. By the 11th of March (96 days), the change had developed itself in the lavender, neroli, lemon, rosemary, and caraway, which, with the plain, *were most discoloured.* Next came cassia, Venice turpentine, less discoloured; and then fennel, almond, and bergamotte, least discoloured. In some cases the interior was more discoloured than the exterior. April 19th, 1862 (135 days), the most changed were the plain and bergamotte; the next best, cassia, lemon, rosemary, lavender, almond, turpentine; the least changed neroli, Venice turpentine, fennel, and caraway. The rest continued good. On the 2nd of June (179 days), the only kinds remaining undiscoloured were rose, pimento, clove, creasote, cumin, sassafras, guaiacum, and balsam of Peru, the least affected of the remainder being benzoin, which now had given way.

By the 10th of September (279 days), rose and cumin had become discoloured, leaving good only clove, pimento, Peruvian balsam, sassafras, guaiacum, and creasote, all of which at the present date are apparently as good as ever.

December 5th of the following year (1862), I put by, under the same circumstances, another series of ointments containing 4 drops to the ounce, and a second series containing only 2 drops to the ounce of the following oils, etc.:—Clove, sassafras, pimento, balsam of Peru, and creasote,—those, in fact, that had comported themselves best on the prior occasion.

By May 5th, 1862 (151 days), the plain ointment was spoiled. By August 11th, 1862 (249 days), the benzoinated and No. 2 sassafras. At the present date (August 29th, 1864), balsam of Peru No. 2 shows symptoms of giving way, but all the rest are apparently as good as ever. In order to ascertain the actual condition of the fats—to try whether or not the test of colour could be relied on—I recovered them by means of benzole from the No. 2 creasote and No. 2 pimento, and found them react perfectly neutral with iodide of potassium, notwithstanding they had been purposely kept under the most unfavourable conditions for upwards of twenty months.

The action of creasote, the great antiseptic, is not difficult to understand; but whether the essential oils shared its power to prevent the putrefaction of albumen remained to be proved. To do so, I prepared a filtered solution of egg albumen, and to 2-ounce portions of it, placed in 3-ounce bottles, I added 2 drops of each of the essential oils I had used with the ointments, dissolved in $\frac{1}{2}$ drachm of rectified spirit. One portion, mixed with spirit only, was placed with them for comparison. They all were set aside in the situation previously occupied by the ointments. The unscented albumen became putrid in 28 days, the other specimens are still good. I expect them to observe the same order in this experiment as in those with the ointments. I may add, that all these essential oils precipitate albumen, some more, some less.

Having succeeded so well with the ointment of oxide of mercury, I commenced, January 22nd of this year, to try similar experiments on pure lard.

Twelve pounds of fresh flare were completely deprived of flesh and membrane, bruised well, washed under a stream of water, and placed in a porcelain vessel over a water-bath. As soon as one-third was liquefied, that portion was strained and set aside. The temperature had not exceeded 140°. This lard I shall refer to as No. 1.

The rest was kept on the bath one hour after total liquefaction, then strained, its temperature being 190°; half of it was set aside=No. 2.

The remainder was gradually heated to 220° and kept at that temperature for five minutes=No. 3. It was much firmer than either of the preceding, and maintained that distinction after being stirred.

Of each of these lards I set aside, in willow boxes, three specimens, viz. lard well stirred, lard mixed with oil of pimento in the proportion of two drops to the ounce, lard mixed with oxide of mercury one drachm to the ounce,—and placed them where the temperature ranged between 70° and 80°.

On the 21st of April (ninety days) I first observed a change in the lards mixed with oxide of mercury,—No. 1, strained at 140°, being the least, and No. 3, strained at 220°, the most altered. The scented and plain lards, tested with iodide of potassium, all produced slight coloration after half an hour, but the scented lards less than the plain. No. 3 appeared to better advantage than the less heated specimens. After thirty hours' exposal on the slab to light and air, a most extraordinary change was observed. Nos. 1 and 2 of the plain lards had assumed an orange colour, No. 3 a similar tint, but only half as dark, whilst the scented lards had lost rather than acquired colour,—in fact produced an ointment at that time perfectly saleable. The contrast was most striking, and continued so for two months; by which time *all* the specimens were of an orange colour, but the scented lards only *externally*,—probably affected by the fumes of the laboratory.

These same lards were again examined July 7. Those mixed with oxide of mercury were all hopelessly bad. The rest were tested with iodide of potassium and after eight hours' exposure presented the following appearances:—Nos. 1, 2, and 3 of the plain were of a lemon colour, the tint of No. 1 being less than that of No. 2, of No. 2 less than No. 3. The scented lards still maintained their superiority, Nos. 1 and 3 being quite useable, No. 2 not so.

August 26, I again examined them, with the same results.

I therefore conclude that oil of pimento, which of those that had maintained the neutrality of oxide of mercury ointment appears the best adapted for the purpose, is a useful, agreeable, and easily applied remedy for preventing or very much retarding rancification in fats and fatty mixtures.

I think I am also justified in adding this corollary—that it is advisable when preparing ointments with a view to their preservation, to use ingredients retaining unaltered the odorous principles with which nature has for obvious purposes endowed them; that is to say, I would use yellow wax instead of white wax, yellow olive oil instead of bleached olive oil. In fact, experiment has shown the superiority of these bodies not meretriciously tampered with, over the some bodies to which a false appearance of excellence had been given by exposure to bleaching agents, no matter how simple and apparently harmless their nature.

The experiments on the effect of temperature I have repeated more than once. They go to prove that it is not advisable to push the heat beyond that of the water-bath, nor maintain it too long at that temperature. I say this feelingly, as the undecisiveness of my first experiment and a certain amount of belief in the old-wives' tale about *boiling* lard, induced me to try the superheating process on a large scale,—and most unfortunate was the result.

I consider the British Pharmacopœia process, where the flare is melted by water-bath, the fat strained from the membrane as soon as possible, and then dried by water-bath, to be an excellent one. I would only suggest the advisability of adding to it oil of pimento or balsam of Peru, in the proportion of 2 drops to the ounce, before placing it in stock. Such addition does not in any way interfere with its medicinal use, and would, as I have shown, much conduce to its preservation.

Weymouth.

ON THE PROCESSES FOR PREPARING SOME OF THE TINCTURES OF THE PHARMACOPŒIAS.

BY MR. W. D. SAVAGE.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

Anxious to do something, however little, to promote the objects of the Pharmaceutical Conference,—I accepted for consideration the *resinous* tinctures, but I soon found the subject would be so limited, and of so little general interest, that I deviated from my first intention, and endeavoured by some mechanical experiments to estimate the relative proportions of extractive matter in some of the more generally used tinctures possessing active properties, and, so far as I could to ascertain the respective merits of the different processes of manipulation. The tinctures were carefully prepared by my son from the same ingredients, at the same temperature, and with the same spirit; so that the results may be estimated with more exactitude. In some cases a second specimen was obtained from other makers. The quantity operated upon in each case was only ʒj (by weight); I have, therefore, for convenience of comparing the product with the pharmacopœia proportions, multiplied it for ℥j, and as the relative proportions are given in the subjoined table of the substances in the L. P. and B. P., it will at one view show the advantages or otherwise of the different modes of preparation. In order to render the comparison a fair one and as analogous as possible, I adopted the following course of action:—As a source of heat I used one of Griffin's earthenware spirit-lamp cylinders (6 inches high and 4 inches in diameter); on the top of this was placed a circular tin basin 5½ inches diameter and little more than an inch deep, filled with sand. On this I put four watch-glasses each containing ʒj of the same tincture made by the four different processes. (I found in practice that it required 2 oz. of methylated spirit, and about three hours for the evaporation of one batch, but in some cases, where the result seemed unsatisfactory, a second and even a third trial was necessary.) The watch-glasses having been previously numbered with a diamond, and their respective weights accurately ascertained, it was easy to ascertain the weight of residual extract, and this was done before any of the extracts absorbed moisture. *After* I had carried out my plan, I found from references made by Dr. Attfield to Dr. Burton's experiments, recorded in the 5th vol. of the Pharmaceutical Journal, that the same course of testing the quantity of extractive matter in tinctures had been carried on by him, but on a much more extended scale, for the purpose of showing the advantage of suspending the ingredients in the menstruum instead of the usual plan of simple infusion. By the way, if Burton's plan is really so effective as it seems to be, and metal vessels (as Mr. Haselden says) not objectionable, Loysell's percolator would be an excellent means for making tinctures, and, I should think, an improvement on the mode adopted by Dr. Burton.

In making comparisons, in the subjoined table, it will be necessary to bear in mind the relative quantities of solids given in the London and British Pharmacopœias. The quantities are placed in juxtaposition for convenience of reference. It seems to me quite evident, that the time allowed for maceration, *usually* 48 hours, in the British Pharmacopœia, is not sufficient, and as a rule not less than 14 days ought to have been recommended; this with percolation would have yielded the best results, for although I have given 21 days, I found in most cases that 14 days was quite as effective *when the materials were properly shaken during the process.*

The tinctures were all shaken up at least three times a day, and each one filtered before it was evaporated.

SOME OF THE TINCTURES OF THE PHARMACOPŒIAS.—RESULTS OF EXPERIMENTS SHOWING INFLUENCE OF PROCESS ON PRODUCT.

		Weight of ingredients in 1 oz. of tincture.		Residue of evaporation of 1 oz. of tincture.				Remarks.
		B. P. grains.	L. P. grains.	L. P. 21 days' maceration. Gr.	L. P. 7 days' maccration. Gr.	B. P. 48hours' maccration with percolation. Gr.	B. P. 21 days' maccration with percolation. Gr.	
1	Tinct. Aurant.	43·75	42	16	15	16	21	
2	ditto	„	„	. .	. .	. .	22	Procured from a respectable chemist.
3	Calumbæ . .	54·68	36	8	8	8	10	
4	Catechu							
	Catechu .	54·68	42					
	Cinnam. .	21·87	30					
		76·55	72	40	34	42	48	
5	Chiratæ . .	54·68	54·68	8	8	6	10	
6	Cinchon. Co. .	. .	. .	. .	. .	22	. .	A specimen procured from Mr. G.
	Pale Bark .	43·75	48					
	Orange P. .	21·87	36					Ditto from Mr. N., *percolation only* 26 grs.
	Serpent. .	10·93	9					
	Saffron .	3	3					
	Cochineal .	1·5	1·5					
		81·05	97·5	30	30	22	24	
7	Cinnamomi .	54·68	42	7	5	8½	10	
8	Gentianæ Co.							
	Gent. . .	32·81	30					
	Orange .	16·4	15					
	Cardam. .	5·47	7·5	. .	. .	20	. .	Sample from Mr. G.
		54·68	52·5	24	20	22	22	
9	Hyoscyami .	54·68	60	15	17	10	15	
10	Myrrh . . .	54·68	36	14	13	16	16	In making the tincture add the *myrrh* to the spirit, and not as is usual the spirit to the myrrh.
11	Opii	38·6	42·3	22	. .	. .	. .	Boiled in water and macer. sp. ten.
12	Opii	. .	. .	. .	. .	. .	. .	28 grs. (Mr. N.) percolation only.
13	Opii	. .	. .	. .	. .	22	. .	Mr. G.
14	Rhei Co.							
	Rhei . .	43·75	30					
	Cardamom.	5·47						
	Coriand. .	5·47						
	Saffron .	5·47	4·5					
	Liquorice .		9·0					
	Ginger . .		4·5					
		60·16	48	22	22	20	24	
15	Rhei Co. . .	. .	. .	. .	. .	. .	. .	22 grs. (Mr. N.) percolation only.
17	Scillæ . . .	54·68	60	55	40	42	60 !*	
		683·32	642·98	239	212	212½	263	

* This result must be from a portion of the water being retained and the difference betwixt the fluid ounce of the Pharmacopœia and the ounce by weight.

Tinct. Aurant.—The 21 days' maceration with percolation yielded no less than 5 grs. more than any of the other processes, and the colour and aroma were decidedly preferable; and the same result was obtained with an additional gr. i. from a specimen tincture obtained from a respectable chemist.

Tinct. Calumb.—Whilst the B. P. has 54½ grs. to 36 grs. L. P., the result is the same, except with the 21 days' maceration, where the yield is one-fifth more.

Tinct. Catechu is also a remarkable illustration of the advantage of additional maceration.

Tinct. Cinchon. Co. yields a larger amount of extractive matter, but only in proportion to the quantity of solids given, being so much greater in the L. P. over the B. P. I had *two* samples of this tincture given me by friends, one of them by *percolation* only, seems an exception to the rule, for it yields 2 grs. more than by 21 days' maceration and percolation; this may arise from a difference in the kind of bark used.

Tinct. Hyoscyami.—The results here by the L. P. process are very different from the preceding ones, but it is readily accounted for, as the lamina only of the second year's herb, with the petiole and midrib removed, was used, and an excellent tincture the result.

Tinct. Myrrh.—In mixing the myrrh with the spirit, it was found most desirable to add the *myrrh* to the *spirit,* and then it was easily shaken up, but if the spirit be added to the myrrh, the mass coheres at the bottom of the vessel and is with difficulty separated.

I think it unnecessary to allude to any other of the tinctures, except *Tinctura Opii.* It will be seen that a remarkable difference is shown, by a specimen (No. 12) procured from a friend who made it by percolation only, and Nos. 11 and 13. It can only be accounted for by a difference in the quality of the opium used. No. 11 was made with the gum, not with the powder, and although the yield of extractive matter was less than No. 12, the colour and peculiar flavour were quite as strong. I thought it desirable to procure some other preparations, besides those made by my son, as a test to confirm or otherwise those previously experimented upon. I regret that other engagements prevented me from trying the whole of the tinctures of the B. P., but I trust sufficient has been adduced to excite attention and further interest in the subject by those better able and with more time at their disposal, for carrying out the results efficiently.

Brighton.

ON THE CULTIVATION OF MEDICINAL PLANTS AT MITCHAM.

BY THOMAS T. P. BRUCE WARREN, PRÉPARATEUR IN THE LABORATORY OF MR. WILLIAM HOOPER,

7, Pall Mall East, 55, Grosvenor Street, and Mitcham.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

The medicinal plants principally cultivated at Mitcham are—Lavender, Peppermint, Chamomiles, Roses, Liquorice, and Henbane. Large quantities of Poppies, Rosemary, Squirting Cucumber, Belladonna, and Pennyroyal are also cultivated, and smaller quantities of Spearmint, Marshmallow, Horehound, Foxglove, Stramonium, etc.

The amount of ground laid out for the cultivation of medicinal plants varies every year; the total acreage under cultivation at present is 736 acres, and consists of—

Chamomiles (*Anthemis nobilis duplex*)	55 acres.
Roses (*Rosa Gallica* et *Rosa Damascena*)	119 „
Peppermint (*Mentha Piperitæ nigra*)	219 „
Lavender (*Lavandula vera*)	172 „
Henbane (*Hyoscyamus niger*)	30 „
Liquorice (*Glycyrrhiza glabra*)	32 „
Sundries	109 „
Total	736 acres.

The sundries consist of—

Stramonium (*Datura Stramonium*); Horehound (*Marrubium vulgare*); Savine (*Juniperus Sabina*); Pennyroyal (*Mentha Pulegium*); Mallow (*Althæa officinalis*); Spearmint (*Mentha viridis*); Rosemary (*Rosmarinus officinalis*); Squirting Cucumber (*Elatérium Momordica*); Belladonna (*Atropa Belladonna*); Foxglove (*Digitalis purpurea*); Poppies (*Papaver somniferum*); Rue (*Ruta graveolens*); Celandine (*Chelidonium majus*); Elecampane (*Inula Helenium*); Balm (*Melissa officinalis*); Wormwood (*Artemisia Absinthium*); Hyssop (*Hyssopus officinalis*); Tansy (*Tanacetum vulgare*); and many others of less importance.

The greater portion of the Lavender and Peppermint is distilled for the oils.

Formerly, a considerable quantity of Chamomiles, Rosemary, Pennyroyal, Rue, and Spearmint, was cultivated for distillation, but they are now merely dried.

The yield of oil per acre varies with the season and the soil on which the plants are raised; scarcely ever does it happen that two acres turn out alike; hence different growers obtain different amounts of oil.

The average yield of oil from Lavender is from 10 lb. to 11 lb. or 12 lb. per acre; one grower informed me that it averaged from 12 lb. to 24 lb. per acre.

I have been assured by a distiller that even more than 24 lb. of oil were obtained from Lavender some years ago, and that the plants remained good for four or five years; but the maximum yield of even the best summers of late years is about 12 lb. per acre.

The Lavender plants are now renewed after three years; and it is a singular fact, due, no doubt, in part to a want of skill in planting and slipping the plants, that the yield of oil, even from the third year's growth, is scarcely sufficient to repay for the labour and expense of distilling,—the yield of oil from plants of the second year's growth being greater in every case than either that of the first or third year's.

The yield of oil per acre, from Peppermint, likewise varies with the season; the yield obtained by different growers is from 8 lb. to 12 lb., 10 lb., 8 lb. to 12 lb., 10 lb., 8 lb.

The effects produced by the qualities of the soil are more striking in the case of Peppermint than in any other plant. Two crops of Peppermint standing side by side indicate, when distilled, considerable difference in the yield of oil; and the smaller quantity is not unfrequently obtained from that crop which had the most promising appearance; and it has been remarked by many growers, both at Carshalton and Mitcham, that Peppermint plants raised at Mitcham, and laid out at Carshalton,* yield a very different product when distilled, both in the aroma of the oil and the quantity obtained. I may observe, that equal care is taken both in tillage and cultivation, and that the superiority of the Mitcham produce is due to some peculiarity of the soil alone.

I examined a sample of Chamomile flowers, which the grower informed me he cultivated entirely for distillation, and which, as dried flowers, he had a

* Carshalton is the parish adjoining Mitcham.

difficulty to dispose of. I could see no difference, further than the flowers were fuller and more expanded. It is not improbable that the oil receptacles might have an abnormal development by manuring and particular care. I do not believe that it is a distinct variety. The yield of oil per acre from this kind is 8 lb.

The yield of Chamomile flowers per acre is about 4 cwt.

Pennyroyal yields about 12 lb. of oil per acre; and so extremely variable is this plant in its yield of oil, that one grower informs me that he obtained only five ounces from a quarter of an acre; of course he ceased to cultivate Pennyroyal for distillation.

The Provence Rose is extensively cultivated for the production of rose-water; large quantities are also dried for the London markets. The Damask Rose is cultivated by a few growers for drying, and is never distilled.

During a favourable season 300 bushels of Roses are produced per acre.

If all the Lavender and Peppermint cultivated were distilled, the amount of oil supplied by Mitcham will be about 2190 lb. Ol. Menthæ Pip., and about 2060 lb. Ol. Lavand.; but as a considerable quantity of Lavender is "bunched" and dried, the amount of oil supplied must be much less.

Between 30,000 and 40,000 bushels of Roses are annually produced in Mitcham, and about eleven tons of Chamomile flowers.

Great care is taken in gathering and drying these flowers. The Roses are collected before sunrise.

They are dried in ovens heated by air, and are maintained at a constant temperature of 100° F. by a regulating arrangement.

After the Chamomiles are dried they are "picked." This operation consists in separating the darker flowers.

The "bunched" plants are dried in open sheds, secluded from the action of direct sunlight.

The stills are of very large capacity, holding from 1000 to 2000 gallons. A charge occupies from six to eight hours. The distillation is conducted at the lowest possible temperature; and, as soon as the contents of the retort have reached the boiling-point, the fire is withdrawn.

The finest portion of the oil comes over during the first period of distillation, and the receiver is exchanged. Only two qualities of oil are generally collected and the receivers are exchanged after three hours' run.

There is a peculiar fragrance and delicacy in the oil first obtained, which is decidedly wanting in the product which comes over towards the end.

I find that a much less proportion of camphor exists in the Mitcham oils than in oils generally. This might be due to their freshness, and to the peculiar alchemistical notions of the distiller of conducting everything in the dark. No doubt, exclusion from the actinic rays is as desirable for the preservation of essential oils as other products of the vegetable kingdom.

The oils generally are of very light specific gravity, and their refractive power is very great.

In operating with such large quantities of water, involving as it must some considerable loss of oil, a plan was tried, some time ago, to economize this unnecessary consumption of the oil, by using the impregnated water for successive charges of the retort, but the expense of pumping and storing away this water was greater than the loss arising from the solution of the oil.

The extracts obtained from Belladonna, Foxglove, Stramonium, Henbane, Poppies, and Elaterium, cultivated at Mitcham, are in their action and appearance very good.

In the laboratory of Mr. William Hooper these cultivated plants have been very extensively consumed; and there can be no doubt but that the uniformity of these extracts, as regards their medicinal activity, is due in part to cultivation;

but it must not be overlooked that the process by which these extracts are obtained is calculated to preserve the activity of the plant,—for extractive matter, if oxidized, ceases to be soluble.

The soil of Mitcham is generally a good holding one, that is, retains moisture well, and is naturally rich. It varies in depth even on the same estate, being in some places only a few inches, whilst in others it is several feet.

Most growers supply large quantities of manure to their land, but evidently do not supply the elements abstracted by the growing crops, as the yield is continually diminishing. They do not lay out for two successive seasons the same plants on the same ground. This is axiomally admitted by them to be as desirable as the rotation of agricultural crops. Some growers plant potatoes, etc., after peppermint; and, after renewing the soil with manure, again plant peppermint. This plan is considered highly beneficial to the production of good crops.

The uncertainty of the seasons in England, and the introduction of foreign produce, have considerably reduced the annual production of Mitcham. A large farm, consisting of more than 1000 acres, which was a few years ago laid out with Lavender, Peppermint, Roses, Chamomiles, Caraways, and Henbane, is now employed entirely for the production of cereal crops; and most growers, rather than meet with the disappointment of a failure, lay out a large proportion of their land with culinary vegetables.

The flowers obtained during a very dry season such as the past, yield a larger proportion of oil than the flowers obtained during an ordinary summer; but, from the combined effects of the frosts during the latter part of May, less oil will be obtained this year than for years past. The yield of Oil of Lavender will be from 4 lb. to 5 lb. per acre.

I have intentionally omitted to include in this paper the analyses of the soils, as I consider them more intimately connected with the phenomena of cultivation when considered in reference to physiological effects, and which I intend to lay before the conference in a paper on "The Effects of Soil and Cultivation on the Development of the Active Principles of Plants."

ON THE PREPARATION OF SMALL QUANTITIES OF CONCENTRATED INFUSIONS.

BY MR. T. GRUNDY.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

The subject of concentrated infusions has been so often treated, that there is but little new to be said about them. I have, however, used a process for making them which has given me satisfactory results; and as it is applicable to a pint of infusion, I think it will answer the question proposed to the Conference. It is, of course, needless to point out that no concentration can exactly represent the infusions of the Pharmacopœia, on account of the necessary employment of spirit, to keep the product. Personally, I hold the opinion that a concentrated infusion, *when well made*, is superior to a fresh infusion, and answers the purpose of a chemist better; but the authorities on the other side are numerous and important.

The principle on which I proceed is that of hot percolation. I have had a percolator made of tin, being a double tin drum, with an inlet pipe at the bottom, and a small jet at the top; the bottom pipe is then connected with a little tin boiler placed over the gas. Steam is generated in the boiler and passes into the casing of the percolator, blowing off at the little jet at the top. The bottom of the percolator is made of wire gauze, on which a piece of filtering-paper and some sand is put. I also employ a sieve of about twenty meshes to the inch, through which the ingredients are passed.

In the present Pharmacopœia there are twenty-seven infusions: twenty-three are prepared with hot water, three with cold, and two with water at 120°. The process which I adopt is this, for illustration of which I will take Inf. Buchu, it being a substance of strong flavour, and one which is therefore more difficult to concentrate. Take half a pound of buchu, or bucco. If the leaves are not perfectly crisp, warming them in a tin pan over steam will render them so in ten minutes. Bruise in a mortar, and pass all through the sieve. Then put in a jug, and add just sufficient boiling water, to damp the powder. In half an hour transfer to the percolator, pack, and set the boiler at work. In a few minutes' time, or as soon as the mass is warm, pour boiling water on the top of the ingredients, and percolate till the liquor obtained amounts to half a pint. Remove this and add thereto, when cold, three ounces of rectified spirit. Continue percolation till another half-pint is obtained; evaporate this in a very shallow pan at a temperature of about 100° to five ounces, and when cold add to the other. Continue to percolate another half-pint, and evaporate this to two ounces, which will make up the bulk of twenty ounces required. The resulting product, after standing a week, may be filtered off, and will be found on dilution in the proportion of one part to seven of water to give an infusion equal in flavour to that of the Pharmacopœia, and superior to it in clearness and brilliancy. This process will do for the great majority of the infusions.

Inf. Aurantii is best made with the peel cut small and not passed through the sieve. Inf. Rosæ Co. is best made with water, and when finished to bulk 90 minims of strong sulphuric acid added, with constant stirring, to each pint. Inf. Lini is, from its thickness, insusceptible of concentration. The two infusions at 120° must be worked by the aid of a thermometer; fortunately they are but seldom required. There remain only the three cold infusions; of these, Calumbo and Quassia are most easily made by the above process, *minus* the heat.

We now come to Inf. Gentianæ. The quantity ordered in the Pharmacopœia will, in practice, yield about nine ounces, and as two ounces of proof spirit are contained therein, this will practically give in an eight-ounce mixture, taken in six doses, nearly two drachms of rectified spirit for a dose. Such a preparation can hardly be called an infusion, it is simply a weak tincture. It does not bear concentrating lower than double its strength. When containing nearly twenty-five per cent. of spirit it will keep well. I think the simplest process is to use double the quantity of ingredient, and let it stand double the time. The chief point in the percolation is the management of the sand, by using more or less of which the rate of the percolation can be regulated.

In evaporating, I prefer a very flat pan at a comparatively low temperature; the volatile part of the plant does not rise so readily with the watery vapour. I have had a large flat double-tin pan made, which is supplied with steam in the same way as the percolator.

Chalk Farm Road, London.

NOTE ON *POTENTILLA TORMENTILLA.*

BY MR. JOHN ADAMS.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

Potentilla Tormentilla is a plant belonging to the Order *Rosaceæ*, De Cand., and grows abundantly in woods and on commons. It is sometimes called Septfoil, from the Greek Ἑπταφύλλον, which means Seven-leaf, because it usually has seven long narrow leaves at a joint. The flowers grow on the tops of slender stalks and are of a yellow colour. The root is of a blackish colour outside and reddish within, thick and knotty. It flowers from June to the latter end of September. The part of the plant used in medicine is the root, and it is usually considered to possess the valuable properties of being very astringent, febrifuge, and *not* stimulant,—properties which certainly entitle it to a more extensive use in consequence of producing its astringent effects without causing excitement. It was much esteemed by most of the older writers on botany and materia medica, who pronounce it an excellent medicine, not only in cases of diarrhœa, but also dysentery and hæmoptysis; and it is still used in some districts, with very good effect, by the people who make tea (infusion) of it. The tincture is used with success in diarrhœa mixtures. Its use however in modern pharmacy has been very limited, one preparation only having been ordered in the pharmacopœias up to the time of the British Pharmacopœia, from which it is altogether excluded. I am of opinion that in the next edition of the Pharm. Brit. it would be useful to retain the decoction as heretofore, and also to add two more preparations of it, the "infusion" and the "tincture," prepared according to the following formulæ :—

Tinctura Tormentillæ.

℞ Rad. Torment. Contus. . . . ℥iv.
Proof Spirit . . . . Oij.

Macerate for twenty-eight days and filter.

Infusum Tormentillæ.

℞ Rad. Torment. Contus. . . . ʒvj.
Aq. Bullient. . . . . Oj.

Macerate for two hours in a vessel lightly covered, and strain.

ON THE CALABAR BEAN.

BY J. B. EDWARDS, PH.D., F.C.S.,

LECTURER ON TOXICOLOGY, ETC, AT THE LIVERPOOL SCHOOL OF MEDICINE:

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

When the Calabar Bean is decorticated, it yields 30 per cent of spermoderm and 70 per cent. of white kernel. Exhausted by about three times its weight of hot rectified spirit, it yields 5 to 6 per cent. of alcoholic extract, which, upon evaporation, separates into two liquids, miscible with chloroform, but soluble only with ether.

The alcoholic dry extract yields, with water, an emulsion of a white character, which becomes pink by exposure to air and light. In the proportion of 5 grains of extract to 1 fluid drachm of water, equal to 120 grains of kernel, 1 minim represents 2 grains of kernel. This quantity, applied to the pupil, produces a contraction which is maintained for five days.

The tincture is prepared by percolation, thus :—

Kernel, in powder . . . ℥j.
Spirit of Wine . . . . ℥j.

Macerate 48 hours, then percolate with 1 ounce of spirit, or sufficient to produce 2 ounces of tincture. The dose is from 5 to 15 minims, 5 minims being equal in activity to 3 grains of the kernel. That which I have prepared is of a much lighter colour than that described by Dr. Frazer. It is said to be valuable in erysipelas, delirium tremens, fibricula, acute bronchitis, and rheumatic fever.

The tincture is probably the most valuable pharmaceutical preparation, as an internal remedy, while the aqueous emulsion is the form adapted for external application by the oculist.

The structure of the bean is very interesting under the microscope. The cells of the spermoderm form interesting sections, whilst the kernel consists of loose cellular tissue, containing very large starch granules.

Both acids and alkalies develope peculiar colouring principles. One appears to be a red colouring matter, developed by caustic potash; in an aqueous solution it may be removed by chloroform, and collected therein as a brilliant scarlet opaque solution.

A pink colour is also developed by sulphuric, nitric, and hydrochloric acids, with, however, a coagulation of some albuminous principle. Caustic soda simply bleaches the extract, whilst caustic ammonia developes a yellow colouring matter which, upon exposure to air, gradually changes from yellow to a grass-green, and finally a stable indigo-blue colour. It is not improbable that the latter reaction may be an important fact in the commercial history of the bean. The physiological properties of the bean being perfectly antagonistic to those of strychnia, it is somewhat remarkable that the chemical reactions of the extract bear a remarkable resemblance to strychnia with the "colour tests." The chief distinction lies in the crystalline character of strychnia, and the fact that it is not changed in colour by sulphuric acid. When chemicals yielding nascent oxygen, or ozonized salts are added to the acid mixture, the reactions consist of a play of blue, purple, and red colours, which might be mistaken, when observed in minute quantities, for those of strychnia. [These reactions were exhibited to the meeting.] I am now acting upon a large quantity of the beans (50 to 60 pounds), and hope, in a future communication, to be able to give further information than is at present known with respect to the character and composition of the alkaloidal principle and the colouring matters which may be obtained from these remarkable beans.

ON THE MORPHIA SALTS OF COMMERCE.

BY W. E. HEATHFIELD, F.R.G.S.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

Amongst the many vegetable products from which are obtained the alkaloidal bodies, there are none, as at present known, of so complex a character as opium; none which yield so largely their crystalline formations, and none which afford so many substances, each presenting a different feature and a different habit.

Of these substances, amounting to about eleven, six have been carefully analysed, and the verifications of the results by Professor Anderson, of Glasgow, together with the experimental performances upon some of them by Mr. How, have contributed much to render this part of the subject complete. The subjoined list indicates the six bodies to which I refer, and the composition of each:—

Morphia	$C_{34}H_{19}NO_6$	+ 2 aq.
Codeia	$C_{36}H_{21}NO_6$	,,
Thebain	$C_{38}H_{21}NO_6$	,,
Papaverin	$C_{40}H_{21}NO_8$	,,
Narcotin	$C_{46}H_{25}NO_{14}$	,,
Narcein	$C_{46}H_{29}NO_{18}$	,,

And it is to be observed that the two first-named, *i. e.* morphia and codeia, differ from each other exactly by C_2H_2, and it suggested itself to Mr. How (whose experiments were tried in the year 1853, as detailed in the 'Journal of the Chemical Society,' vol. vi. p. 125, May, 1854), that morphia might be converted into codeia by the decomposition of an agent ready to part with the elements in question, and so produce the proposed effect.

But easy as the transition of morphia into codeia appears, on a comparison of their respective rational formulæ, the object was not attained by Mr. How, who came to the conclusion, that by any means at present within our reach, no great stimulus is afforded to us to prosecute inquiries for the production of this or other of the natural alkaloids. It is true that Mr. How obtained, by means of iodide of ethyl acting on morphia, a salt isomeric with hydriodate of codeia, but beyond isomerism it was in no way identical with it, for the base of the new salt was widely different in its physical and chemical properties from codeia. Yet it has been thought by some eminent manufacturers of morphia and codeia, that there is a tendency on the part of the former to change into codeia under the influence of certain agencies, and it would be an interesting feature if this point could be established.

In following out some experiments, having in view the state of hydration, and the freedom from codeia of the morphia salts of commerce, I endeavoured, after examining samples from various sources, to confine myself more especially to those of different manufacturers, and I propose to report upon three specimens, each being of different make. Of each specimen 100 grains (of hydrochlorate of morphia) were dried at a temperature of 212°.

No. 1.	100 grains.	Weight after drying,	95 grains :	loss, 5 grains.
No. 2.	100 grains.	„ „	92 grains :	loss, 8 grains.
No. 3.	100 grains.	„ „	90·2 grains:	loss, 9·8 grains.

The characteristics of solubility were as follows :—

No. 1, immediately on contact with water, became dark in colour, and united to form a clot, taking some minutes to dissolve, and then forming a solution somewhat coloured.

No. 2, on contact with water, became very slightly coloured, formed but little clot, and dissolved in less time considerably than the former, producing a solution slightly tinted.

No. 3, not at all darkened on contact with water, remained pulverent, and separate, and dissolved with rapidity, forming a perfectly colourless solution.

On precipitating a solution of 100 grains of hydrochlorate of morphia from each of the three specimens, the results were as follows :—

No. 1.	Precipitate, coloured yellow, and pulverent (dried at 212°)	79·7.
No. 2.	Pearly white, crystalline	76·7.
No. 3.	Less white, less crystalline	74·3.

These precipitates were entirely soluble in a solution of caustic potash; and were scarcely acted upon by anhydrous ether.

100 grains of acetate of morphia from each of three specimens were subjected to a temperature of 212°, and lost as follows :—

No. 1.	100 grains.	Weight after drying,	95 grains :	loss, 5 grains.
No. 2.	100 grains.	„ „	90 grains :	loss, 10 grains.
No. 3.	100 grains.	„ „	87·4 grains :	loss, 12·6.

No. 1, on applying the heat of a water bath, became dark-coloured, fused into a coloured mass, and finally lost its structure.

No. 2, on applying a similar heat, became partially fused and dark-coloured, but scarcely lost its structure.

No. 3 retained its pulverent form throughout the process.

On an examination being made of the precipitates by ammonia from the hydrochlorate of morphia, they proved to be morphia in a high degree of purity, perfectly soluble in caustic potash, scarcely acted upon by ether, and almost entirely free from codeia, as was also the mother-liquor from which they had been precipitated.

On a review of these experiments, it will be observed that the three samples of hydrochlorate of morphia contained varying proportions of water, and varying quantities of the alkaloid in like proportion,—that which was the least soluble, No. 1, having the largest proportion of the alkaloid, that which was most so, containing the largest proportion of water, as in No. 3; the difference between No. 1 and No. 3 being equal to nearly five per cent. of water, and nearly five and a half per cent. of alkaloid. The codeia appeared in each specimen to have been carefully separated. The range of moisture in the acetate was a little wider than in the hydrochlorate, the loss in No. 1 being five per cent., whilst that in No. 3 was about twelve and a half per cent.

I regret that I have not been able to carry out this investigation to the extent that I had proposed and wished, but should I be again permitted to furnish a paper to the Conference, I hope to devote more attention, and to direct my observations more usefully.

ON COMMERCIAL PHOSPHORIC ACID.

BY R. PARKINSON, PH.D.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

What is the quality of the diluted phosphoric acid met with in commerce, and what the best and safest method of obtaining it of constant strength? is the question to which I have undertaken to devote some attention. The quality I take to mean firstly *strength*, inasmuch as this is an article not generally likely to be much adulterated, except with water, and secondly the presence of foreign substances in it, among which meta- and pyrophosphoric acids may be included. From my provincial position and general close confinement to home, I have been unable to make a properly representative collection. I have however through the kindness of friends obtained and examined about thirty samples, twelve or thirteen of which were collected for me from wholesale and dispensing houses in London and neighbourhood, by Dr. Attfield, and the remainder are from towns in Yorkshire, Lancashire, Cheshire, and one from Cumberland. I have arranged the results in the form of a table, giving the percentage of acid, the specific gravity, and other remarks where necessary; and I have placed at the head of the list, for standards of comparison, the percentage and specific gravity of the acids of the British and London Pharmacopœias respectively. It will be seen that only three of the specimens come up to the B. P. standard, two more are considerably above P. L., then again three may be regarded as sufficiently near P. L., and the remaining twenty are of various shades of declension. I have observed in some cases a discrepancy between the specific gravity and the percentage amount, for which I cannot account. I have re-examined some of the more glaring ones, but could arrive at no other result, and had not time to go through them all again. The specific gravities were all taken consecutively and at a different time from the percentages, which were estimated by the volumetric method with nitrate of uranium, originated by Mr. Sutton. In those samples, which are made from glacial phosphoric acid, and which contain phosphate of ammonia, the percentages will not represent the free acid, but the total amount both free and combined. I have been unable to devise a satisfactory method for readily ascertaining the amount of free acid. The ordinary plans of acidimetry will not do, as may be known, when it is considered that the chemically neutral phosphates have an alkaline reaction.

The method ordered in the B. P., *i.e.* noting the increase of weight in some oxide of lead, after digestion with the acid, will of course be open to the same objection as the uranium process, because the phosphate of ammonia will be decomposed by the oxide of lead and the whole of the acid thus accounted for. I have not made any use of the B. P. process, as it occupies

RESULTS OF EXAMINATION OF SAMPLES OF DILUTE PHOSPHORIC ACID.

No.	Per cent. of PO_5.	Specific gravity.	Remarks.
B. P. . . .	10·0	1·080	
B. L. . . .	8·7	1·064	
1 . . .	10.4	1·074	Up to B. P.
2 . . .	10·0	1·064	Up to B. P.
3 . . .	10·0	1·073	Up to B. P.
4 . . .	9·3	1·065	Above P. L.
5 . . .	8·9	1·073	Above P. L.
6 . . .	8·8	1·062	About P. L.
7 . . .	8·8	1·061	About P. L.
8 . . .	8·6	1·062	About P. L.
9 . . .	8·4	1·049	Under P. L.
10 . . .	8·3	1·055	Under P. L. Contains ammonia.
11 . . .	8·3	1·057	Under P. L.
12 . . .	8·0	1·051	Under P. L.
13 . . .	8·0	1·051	Under P. L.
14 . . .	8·0	1·047	Under P. L.
15 . . .	7·7	1·046	Under P. L.
16 . . .	7·4	1·055	Under P. L. Contains ammonia.
17 . . .	7·4	1·051	Under P. L.
18 . . .	7·0	1·056	Under P. L. Contains ammonia.
19 . . .	7·0	1·044	Under P. L.
20 . . .	6·9	1·043	Under P. L.
21 . . .	6·9	1·046	Under P. L.
22 . . .	6·9	1·043	Under P. L.
23 . . .	6·8	1·052	Under P. L.
24 . . .	5·9	1·041	Under P. L. Contains ammonia.
25 . . .	5·9	1·037	Under P. L.
26 . . .	5·8	1·035	Under P. L. Contains ammonia.
27 . . .	5·8	1·036	Under P. L.
28 . . .	5·6	1·061	Under P. L. Contains ammonia and sulphuric acid.

too much time, and is not, I believe, practically more accurate than that with uranium. The most satisfactory way seemed to be to supersaturate with lime of known value to a certain volume, allow the precipitated phosphate of lime to subside, and estimate the excess of free lime in part of the clear liquid. This however takes considerable time. I may mention that while experimenting this part of the subject in various ways, and working with the colouring-matter of violets as an indicator and caustic potash as the neutralizing agent, I was struck with the fact, which seemed tolerably constant, that the red of the violets (in the acid liquid) was changed to blue when one-third of the amount of alkali had been added that was necessary to produce the green, which showed that the alkali was in excess. This did not always occur with chemical exactitude, but taken together with the tribasic character of the phosphates it seemed interesting and to merit further examination. Litmus did not show this at all, but turned a bluish-purple about when the violets turned blue, and so remained till a considerable excess of alkali had been added, no sharp line of demarcation being anywhere visible.

I have examined most of the specimens for free nitric acid, finding however only traces in any of them, also for phosphorous acid, which was absent from all I tried, as were also meta- and pyrophosphoric acids. In No. 28 I noticed a wide difference between the specific gravity and the percentage of acid. The acidimetric estimation also showed the presence of considerably more acid than the uranium accounted for as phosphoric. I therefore examined it further, and found a considerable quantity of sulphuric acid. I then examined some of the others, but did not meet with it again.

I have said that the samples made with glacial phosphoric acid contain ammonia; this I believe to be so universally the case, that the presence or absence of ammonia shows the method of manufacture. The glacial acid is made commercially by heating phosphate of ammonia, when theoretically the ammonia should be all volatilized; practically however it is not so. The amount retained will probably vary with nearly every sample; I therefore examined only one, to get some idea of what might be the case. It was a sample of German, procured for me by Mr. Reynolds, and which I found to contain 5·5 per cent. of ammonia; if we consider this to have been present as tribasic phosphate, it is equal to 16·7 per cent.; if however it be as monobasic or metaphosphate of ammonia, if such a salt exists, there is 44·1 per cent. of it. It is this fact that constitutes the principal objection to the use of the glacial acid, at least of the present commercial article, as the source of the diluted acid of the Pharmacopœia. It will be known to many that in the last edition of the U. S. P., in addition to a similar process to that in our own, it is said that the diluted acid may also be prepared by dissolving ℥j Acid. Phosph. Glacial. in ℥iij water, adding forty grains of nitric acid, boiling to syrup, then diluting to ℥xiiss. Under the head of Phosphoric Acid Glacial in Materia Medica, it is however among other tests expressly mentioned that no ammonia is evolved from it when potash is added in excess.

To the second division of the question, as to the best and safest mode of obtaining dilute phosphoric acid of a constant strength, I regret that I have been unable to find a satisfactory solution. Under present circumstances, I think the B. P. process—objectionable as it certainly is, more however, as I believe, on the score of tediousness than of danger—is the best for use on the small scale, and by those comparatively unaccustomed to the manipulation of chemical apparatus, both as to the process itself and also as needing no explanation of the product beyond making up to a prescribed quantity, after of course fulfilling the directions given,—and therefore probably the best for insertion in such a work. I am sorry however that I have not had opportunity of trying further the substitution of amorphous for ordinary phosphorus, as suggested by Mr. Groves (Pharm. Journ. vol. xvii. p. 510), as it seems likely to be an improvement, and now that red phosphorus is a commercial article, might be readily carried out. I had not however seen his suggestion till too late for any experimenting on it. If it should be thought worth while to continue the question to me, I will endeavour to go further into it during the next year.

Whilst I thus think that of the B. P. to be the most convenient process, I believe that the simple combustion of phosphorus, with proper arrangements for supply of air and collection of the acid, will be every way better on the large scale. I made my own acid in this way on a small scale with a bell glass some years ago, and was able to make eight or ten times the quantity in the time as by the pharmacopœia process. A very good figure of apparatus for the purpose is given in Miller's 'Chemistry,' it may of course be modified according to circumstances. I have seen somewhere, in some German work I believe, a similar sketch of apparatus, but using a large carboy and an aspirator. The product of this operation, when dissolved in water, is a mixture of meta- and pyrophosphoric acids, and, if sufficient air has not been admitted, of phosphorous acid also ; it is therefore necessary to boil it with a little nitric acid, as in the pharmacopœia process. On the large scale, however, this might easily be made into a pure glacial acid, and if such an article were commercially attainable, I am quite of opinion that plain directions for its dilution, etc., as given in the U. S. P., would be the best pharmacopœia process, placing the glacial acid as they do in the list of materia medica.

If not trespassing too much on your time, I will shortly mention one or two processes I have tried and the results arrived at with regard to them Neustadt (Chem. News, vol. iv. p. 13) publishes a method for obtaining phosphoric acid pure on the large scale from bone-ash, converting it first into a soda salt, then phosphate of baryta. The quantity of the latter from one part of bone-ash he directs to be mixed with one part of sulphuric acid diluted with three parts of water and stirred occasionally for two or three days, until no sulphuric acid is found in the liquor. This reads very well, but, like some other nice things, at least in my hands, does not work as it reads. I commenced with phosphate of soda, which is easily obtained pure in commerce, and made the phosphate of baryta from it. This I digested with its equivalent of sulphuric acid, diluted as directed; considerable heat was evolved, showing that action was taking place, after three days, however, with frequent shaking, sulphuric acid was still present in the liquid. I left it another week, shaking occasionally, and still there was sulphuric acid. I then boiled it for three or four hours, and still there was sulphuric acid. I then filtered off and washed the precipitated sulphate of baryta, etc., and added more phosphate of baryta to the filtrate ; then I certainly had no sulphuric acid, but, what was worse, phosphate of baryta was dissolved in the free phosphoric acid. To this I cautiously added dilute sulphuric acid while hot, until no further precipitate was produced. I had then certainly pure phosphoric acid, but, as it seemed to me, at too much trouble and risk of danger from the presence of the poisonous baryta compound (or, on the other hand, from excess of sulphuric acid) for it to be a good pharmacopœia process.

I then tried decomposing phosphate of lead, suspended in water, by means of sulphuretted hydrogen. Phosphate of lead is easily prepared from the commercial phosphate of soda, and for some time I thought this would prove a satisfactory and easy process. Repeated experiments showed, however, that small particles of the phosphate were apt to escape decomposition unless the recently precipitated salt were used and it was rubbed up perfectly smooth with the water, and also an excess of sulphuretted hydrogen ensured for some time (which is an objection of itself); and in this case, as in that of the baryta process, the acid, unless immediately filtered off, contained varying quantities of dissolved lead salt, the mere possibility of which unfits it as a process for inexperienced hands. If properly carried out, however, I believe this to be a good and easy method.

With regard to the use of the glacial acid as the source of the dilute phosphoric acid, it is stated in the 'Lancet' (1864, vol. i. p. 361) that such an acid will not do for Syr. Ferri Phosph. The objection to it for this purpose entirely, as I believe, consists in the presence in it of meta- and pyrophosphoric acids, which, as Maisch has shown (Pharm. Journ. vol. iii. p. 278), remain under certain circumstances much longer undecomposed than had previously been imagined. Boiling with a small quantity of nitric acid, as ordered in the U. S. P., effectually removes them, and the acid is then (if made from pure glacial) pure and fit for any of the purposes to which it may be applied.

I thought this fact might have a bearing on some of the awkward circumstances that have occurred in the dispensing of prescriptions containing phosphoric acid and iron salts, one of which is mentioned by Mr. Deane (Pharm. Journ. vol. iv. p. 508), and one which came to my own knowledge where a prescription ordering, Tinct. Ferri Mur. ℥ss, Acid Phosph. Dil. ℥ss, Aqua ad ℥xij, was made turbid at one place and clear at another. The case mentioned by Mr. Deane is however, as he found, independent of any presence of metaphosphoric acid, strength and mode of mixing being the causes of the difference of appearance in the mixtures in question. The other case is so dependent. The acid which produced the turbid mixture contained the monohydrate. In experimenting on this, I found sesquichloride of iron to be equally as delicate a test for this hydrate as nitrate of silver. It gives with it a yellowish-white precipitate, insoluble in free acid. I was induced, on noticing the above, to see how long glacial phosphoric acid, when simply dissolved in cold water, would retain any monohydrate. Maisch (Pharm. Journ. vol. iii. p. 278), as already mentioned, shows that the conversion is not so rapid as was supposed, but found that at their American summer temperature it was complete in two or three weeks. In the beginning of December, I made some dilute acid, L. P. strength, from glacial, by solution in cold water. This gave a white precipitate with nitrate of silver, also with sesquichloride of iron, as noted above. I tried this in the same way, at intervals, to the end of March, nearly four months,—the turbidity of the iron mixture certainly somewhat decreasing, but unmistakably present. I then, from other engagements, did not try it again till the middle of July. then it gave a clear mixture with iron and also no precipitate with nitrate of silver.

Bradford, Yorkshire.

ON THE ASSAY OF THE ALKALOIDS IN PHARMACEUTICAL EXTRACTS.

BY THOMAS B. GROVES, F.C.S.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

The proneness to change, characteristic of all watery extracts, added to the frequent mal-preparation and sophistication of those devoted to medicinal uses, point to the desirability of inventing a method by which their degree of activity may be readily ascertained; and, although I have strong doubts of the possibility of arriving at *exact* results by a *ready* process, I hope my experiments in that direction may not be deemed wanting in interest or otherwise undeserving attention.

The subject naturally divides itself into two parts—the preliminary processes for getting the active part of the extract into a state adapted for estimation; the estimation itself.

I am compelled, as it were, to put the cart before the horse, by taking up the latter point first, in order to decide on the kind and degree of preparation necessary for a near approach to accuracy.

The ease and nicety of well-devised volumetric methods are so well appreciated by all, that it would be superfluous to insist on the desirableness of applying, if possible, some such method to the estimation of the alkaloids. Professor Mayer, of New York, has recently made that attempt, having published his results in the 1862 volume of the Proceedings of the American Pharmaceutical Association. The same subject was also very ably and fully treated in the same year by M. Valser, whose thesis, presented to the authorities of the superior school of pharmacy of Paris in order to obtain the title of pharmacien of the first class, was entitled "Study of the Search for, and Distinctive Characters and Estimation of, the Natural Organic Alkaloids."

Both of the experimenters settled on the same reagent, iodohydrargyrate of potassium, M. Valser first reviewing the other reagents previously suggested for the purpose—solution of iodine, chloride of gold, and phosphomolybdic acid,—all of which are passed over as inferior to the one chosen. In point of sensibility the iodohydrargyrate leaves nothing to be desired. It has been proved that by it the presence of $\frac{1}{150000}$ part of strychnia and $\frac{1}{50000}$ of brucia can be readily detected. But in order to effect this, soluble iodides must not be present, for they exert a solvent action on the most intractable of the alkaline iodohydrargyrates.

It is curious to observe that M. Valser, throughout his paper, imagines that the compounds he treats of are new, thus repeating three years later the mistake I had been guilty of in a paper inserted in the 1859 volume of the 'Journal of the Chemical Society.' However, he corroborates generally the formula I had assigned them; whereas the experiments of Mr. Mayer seemed to point to different conclusions. To his results I will now direct attention, it being evidently of first importance to decide on the constitution of the compounds on which the estimation is practically based. His manner of proceeding was to determine "the equivalent quantity of a tenth normal solution of iodohydrargyrate of potassium, by adding it gradually from a burette to a measured quantity of a solution of the alkaloid in 100 parts of dilute acid, and determining the end of the reaction by testing on a watch-glass." The iodohydrargyrate was made by dissolving in water $\frac{1}{10}$ equivalent of chloride of mercury and $\frac{3}{10}$ equivalent of iodide of potassium, making up the volume to one litre. He thus found that the number of equivalents of mercury required for the completion of the reaction varied from 1 to 6, according to the alkaloid. As instances, I will cite aconitia, 1 eq.; atropia, 2 eq.; morphia, $1\frac{1}{2}$ eq.; nicotia, 4 eq.; quinine, 3 eq., etc. He remarked, also, that the mercury consumed in some of these reactions remained partly in solution; but I cannot see the reason why any mercury should necessarily remain in solution, unless an excess of the iodohydrargyrate had been added, or the resulting alkaline compound were to some extent soluble. Whether we have compounds of one equivalent of hydriodate of alkaloid and two or more equivalents of iodide of mercury, or simply one and one, an equation can be framed to meet the case, leaving no uncombined mercury in solution.

In testing these results with the view of ascertaining the cause of error, I, after a few preliminary experiments, adopted test solutions containing respectively one equivalent of alkaloid in 100,000 grain measures, and one equivalent of mercury with three equivalents of iodide of potassium in 50,000 grain measures. These extremely dilute solutions are rendered advisable by the bulkiness of the precipitates, and the necessity for frequent testing by watch-glass; besides which they represent more accurately the conditions under which the practical testing of the extracts would probably have to be conducted. It will be seen that the mercurial being of twice the strength of the alkaloidal solution, equal measures would, on the supposition of the correctness of the formula AlkIH,2HgI, be required to complete the reaction.

Strychnia was the first alkaloid I thus estimated, 100 grain measures of which were apparently neutralized by 110 grain measures of the precipitant. The experiment was repeated with the same result, which was not affected by the presence of a greater or less amount of acid.

Quinine was next tried, and the end of the reaction scarcely reached after the addition of 230 grain measures of iodohydrargyrate.

Cinchonine gave still more abnormal results, the liquid affording a faint reaction after 380 grain measures had been added. This (equal to more than seven equivalents of mercury) being evidently wrong, the filtered liquid was tested with a solution of cinchonine, and the marked reaction that followed unmasked the fallacy. I found, in fact, that a solution of alkaloid undergoing estimation by iodohydrargyrate, gives at the end of the reaction, an ambiguous response to reagents,—a decided precipitation being caused by either alkaloid or iodohydrargyrate. This state of things continues for a greater or less time, according to the nature of the alkaloid. Thus 100 grain measures of quinine and 130 of iodohydrargyrate gave a filtrate reacting still with iodohydrargyrate, but not with quinine; but with 140 grain measures it reacted decidedly with both reagents. This was at 9 P.M. At 9.30 P.M. the same liquid reacted decidedly with quinine, but scarcely perceptibly with iodohydrargyrate. The same results were observed after twenty-four hours' additional delay. Supposing 135 grain measures to be the correct number, the result tends to confirm my original opinion of the abnormal character of the quinine compound, suggestive of an incorrectness in its received formula. I may say, that I have recently repeated the analysis of this salt in the old way, and with the same results as previously. M. Valser's figures were not abnormal beyond this, that they pointed to the old equivalent of quinine, $=162$, being the correct one. Strychnia possesses the same peculiarity as regards ambiguous reacting, but retains it only for a short time. Thus 100 grain measures, added to 100 grain measures of iodohydrargyrate, gave a filtrate that reacted strongly with both reagents. After the lapse of two hours, it had entirely lost its reaction with the alkaloid, and retained that with the iodohydrargyrate in a very small degree only. These phenomena were quite independent of acidity and neutrality.

With morphia the results were more singular. 100 grain measures of this base were estimated in the usual way. After 70 grain measures of iodohydrargyrate had been added, the filtrate proved neutral to both reagents, though hydrosulphate of ammonia indicated the presence of mercury in solution. No alteration was observed after the lapse of twenty-four hours. The 70 were then increased to 100, still no precipitation by ether reagent; but when a solution of strychnia was added, an immediate and abundant precipitate was the result. A series of experiments showed the cause of this to be the ready solubility of iodohydrargyrate of morphia in the iodide of potassium, of which the reagent contains an excess. It is also soluble in hot water,—sufficiently so in either case to precipitate the more sparingly soluble strychnia compound.

Nicotina again presents some peculiarities. 100 grain measures, representing $\frac{1}{1000}$ of an equivalent, were treated with 95 grain measures of iodohydrargyrate. The filtrate was clouded decidedly by a further addition, so also when the amount was increased to 100. At 200 grain measures ($=4$ equiv. of mercury) the reaction was not stopped, but a distinct cloud obtained on adding the iodohydrargyrate *guttatim*. When added in larger quantity, the effect was to redissolve the precipitate. At all stages of the reaction, cinchonia or strychnia, being less soluble, produced a precipitate in the filtrate.

Conia does not behave so similarly to nicotina as would be anticipated from their near resemblance. The reaction stops promptly after the addition of 100 grain measures, $=2$ eq. of mercury, the filtrate not being clouded by an excess of iodohydrargyrate, and only slightly by more alkaloid.

I conclude, then, that Professor Mayer's volumetric assays do not invalidate the formula Alk, HI, 2 HgI, independently arrived at by M. Valser and myself, and that the simple volumetric estimation of the alkaloids cannot safely be attempted, except in the case of some few, such as strychnia and conia, whose reactions are in a great measure devoid of the ambiguities I have pointed out.

It is a question, however, whether or not the rectification of equivalents may not be extended, after M. Valser's method, to other alkaloids less known than those of the cinchona series. Certainly no compounds can well exceed the iodohydrargyrates in adaptibility for that purpose.

Professor Mayer has, in a more recent paper in continuation of the subject, recommended the use of an excess of iodohydrargyrate, and the application of Mohr's method for the estimation of that excess; intending thus to arrive at the amount actually combined with the alkaloid.

Mohr's volumetric method for estimating iodine and chlorine consists in adding to the liquor to be tested, an alkaline carbonate to remove free mineral acid if present, and then a little chromate of potash. A volumetric solution of nitrate of silver, dropped in until the red colour of chromate of silver remains permanent, indicates the amount of chlorine and iodine present. It requires a little practice to detect the passage from yellow to the first tint of orange, but, that difficulty surmounted, the method is easy, and gives pretty accurate results.

In applying it to the assay of the alkaloids, Mr. Mayer directs that, after treatment with excess of iodohydrargyrate, "the beaker be placed on white paper, and carbonate of soda and a few drops of a solution of chromate of potash added, and the tenth solution of silver dropped in until the red colour of chromate of silver remains permanent after stirring. The number of cubic centimetres of silver, divided by 4, and subtracted from the number of cubic centimetres of iodohydrargyrate, leaves the quantity of the latter that has been consumed for precipitation. The last cubic centimetre of silver is not counted." Of the application of this method several examples are given using pure solutions of sulphate of atropia, and the results have every appearance of nicety and exactness. But they must have been mere coincidences *if the professor followed his own directions*, as the chlorine and excess of iodine belonging to that portion of the iodohydrargyrate that had combined with the alkaloid have been entirely overlooked. Even with the formula (AtrHI,HgI), adopted by Mr. Mayer, notwithstanding the results of his volumetric assay, the chlorine would have to be accounted for, and one equivalent of iodine. But on this supposition the numbers will not come right. In fact, I cannot see how the results are arrived at with the numbers given. I quote one of the examples. 10 cubic centimetres of solution of sulphate of atropia are taken—assumed to be equal to 2·95 cubic centimetres of iodohydrargyrate. But 4 cubic centimetres are used, being 1·05 in excess. This should have required 4·20 cubic centimetres of silver. But no; 12·2 cubic centimetres are found, equal to 3·05 of iodohydrargyrate, which, being accepted as excess, leaves but ·95 cubic centimetres combined with the alkaloid, instead of the 2·95 cubic centimetres required by the theory. Mr. Mayer, however, gives the result as 3·05 cubic centimetres. This is exactly one-fourth of the 12·2 cubic centimetres, but surely the result could not have been so arrived at.

The really serious objection to the process is that the iodohydrargyrates with few exceptions, are attacked by the nitrate of silver. The more soluble, morphia for instance, are completely decomposed by it, so that no indication at all of an alkaloid is obtained. Mr. Mayer has now perceived the necessity of meeting both this and the disturbance caused by solubility, for in his subsequent paper on the "Assay of Opium" he points out that the morphia liquors must be concentrated, and the excess of test liquor estimated away from the precipitate. But when strong solutions are used, the precipitate is either clotty or gelatinous, and so not to be washed without much water, thus reproducing the difficulty sought to be avoided. In the "Assay of Opium," the residuary chlorine and iodine is not overlooked, but the assumption of an incorrect formula for the morphia salt, entirely vitiates the figures.

With strychnia, the most insoluble of the iodohydrargyrates, I have not been more successful. When carbonate of baryta or of lime are used, the indication is below the mark; when carbonate of potass in slight excess, the same result; when in considerable excess, or when slightly acidulated with acetic acid, the iodohydrargyrate is wholly decomposed, as in the case of morphia. Between these extremes may be ranged the remaining iodohydrargyrates, whose destructibility by nitrate of silver will be in direct proportion to their solubility. I have found that it matters nothing, whether the alkaloid has been dissolved in sulphuric or in nitric acid.

I am therefore of opinion that the process cannot be applied with anything like accuracy, and anything short of that would be worse than useless. Could it be applied, the following formula would separate the total of silver into that required by the excess of precipitant, and that by the iodine and chlorine belonging to the combined portion—

$$\frac{a-x}{5} \times 8 + x = b,$$

where (a) is the silver solution, (b) the iodohydrargyrate, and (x) the excess.

I am of course sorry to be obliged to differ so completely from the conclusions of Professor Mayer's paper, "On the Assay of Alkaloids, Pure and in Preparations," but I certainly cannot admit either his formulæ or mode of conducting the assay. Something may of course be said as to the degree of dilution, but I believe the solutions I used are as strong as can safely be employed for volumetric purposes, more especially when one considers the clottiness of the precipitates produced in strong solutions, and the consequent danger of the fluid not being brought completely into contact with the precipitant.

It occurred to me that the iodohydrargyrates being all soluble in the liquids that dissolve their respective alkaloids, it would only be necessary to add to the liquid containing them in suspension the proper ethereal solvent, shake well and decant, to get the iodohydrargyrate in a condition to be weighed. The error occasioned by solubility would thus have been overcome. The alkaloid moreover having been increased three or four times, or even more in weight, might have been safely subjected to the balance in cases when the pure alkaloid, owing to its minuteness, could not have been so estimated. But as both ether and acetic ether (especially the latter) dissolve iodide of mercury in proportions that vary in accordance with circumstances not at all times controllable, I could not bring the method to bear.

I will now proceed to the other branch of the subject—the preliminary processes for getting the active principles into a state adapted for estimation. The degree of purification necessary for volumetric estimation by iodohydrargyrate of potass, a process which, though not strictly accurate nor generally practicable, may have admirers, depends entirely on the nature of the extract containing the alkaloids we are in search of. It seems that the only bodies besides the alkaloids it is capable of precipitating, are those of the albuminous series when in acid solution, and certain extractive matters. These must in all cases be got rid of, as well as sulphides. Chlorides also, if the residuary iodine and chlorine are to be estimated, must be eliminated as well as every other substance incompatible with nitrate of silver.

It is doubtless best in all cases to effect as complete an isolation as possible, and for this purpose no general process can answer better than that of Stas. It is not necessary minutely to describe it. It is well known to consist in treating the substance with alcohol at about 150° F., and an organic acid (oxalic or tartaric), evaporating the tincture to dryness and exhausting the extract with the least possible quantity of water. This fluid which, if the operation has been carefully conducted, contains all the alkaloids present in a soluble form, is poured into a long test-tube, to it is added an excess of bicarbonate of potass, and the whole shaken with four or five times its volume of pure ether. The recovered ether washed with acidulated water yields to it the alkaloids it had abstracted. The weak point of the process is this, that morphia is exceedingly insoluble in ether, in fact, unless when recently precipitated and in the hydrated state, it is practically insoluble in that fluid. M. Valser has fortunately hit on a solvent that deprives the process of all ambiguity. He treats the liquor that has been washed with ether with a second washing with acetic ether. In this fluid morphia is readily soluble, and rises with it to the surface, whence it is obtainable in a pure state. It would also be preferable to use chloroform when strychnia is present. In fact the process is not mechanical, but demands in each case some peculiarity of treatment that must be left to the skill of the operator.

I think it can hardly be expected of a pharmaceutist that he shall, for the purpose of verifying his extracts, go through the details of this long and expensive process; for it requires a liberal consumption of alcohol and ether, as well as the expenditure of considerable time, to arrive at correct results. Nevertheless, I am unable to recommend a better or shorter, applicable in all cases. I will, however, shortly relate some experiments in that direction, leaving others to improve what I have not been able to perfect.

Dr. Attfield's paper on the solution of alkaloids in oils, wherein he recommended the alkaloid to be first united with oleic acid, suggested to me at the time the possibility of applying that acid to the elimination of the active principles of extracts. Oleic acid dissolves all alkaloids, is remarkably discriminative in its solvent power, is very cheap, and neither liable to loss from evaporation nor demanding that care in use exacted by such volatile solvents as alcohol and ether.

In experimenting on its applicability, I have added known quantities of alkaloid to extract of cabbage, which I had ascertained by previous trials to contain no body capable of being mistaken for the alkaloid. But I will first describe some blank experiments on pure solutions of alkaloid. My plan of proceeding was to take 100 grain measures of the alkaloid (in the case I am describing, strychnia$=\frac{1}{1000}$ equivalent or ·334 grain), exactly neutralize the free acid it contained, then add 10 grain measures of volumetric ammonia, and about $\frac{1}{2}$ ounce of oleic acid. The mixture when shaken formed an emulsion which was heated for a few minutes by water-bath with occasional agitation. The vessel was kept tightly closed to prevent loss of ammonia. Removed from the bath and cooled, it was treated with 10 grain measures of volumetric oxalic acid. This combined with and exactly neutralized the ammonia, and so destroyed the emulsion. The fluids were encouraged to separate by a second immersion in the bath. The oily stratum removed by pipette was washed with dilute hydrochloric acid, and the washings estimated volumetrically by the iodohydrargyrate. I recovered in this way $\frac{9}{10}$ of what I had inserted, and obtained the same result when quinine was substituted for strychnia. On comparing these figures with those obtained by the use of ether, I found them identical, but the time consumed by one was more than double that of the other, viz. oleic acid, one hour, ether, twenty-five minutes. On the other hand, the cost of one was *nil*, the other involved a certain unavoidable loss of ether. With aqueous solutions of extracts this comparison would be more favourable to the oleic acid, as it rises from such mixtures more readily than does ether, which gives much trouble by forming ether-bubbles, that are to be broken up by long standing, or addition of alcohol, which involves a loss of ether.

With morphia the process did not succeed. The acid removed only the suspended alkaloid, leaving untouched that portion in watery solution. This might have been anticipated, as in consequence of the acid's almost complete insolubility in water, it cannot get within reach of a body so dissolved. The same results would doubtless be obtained with all the more soluble alkaloids.

When oleic acid is added to extract of cabbage, diffused through water, and then treated as before described, it rises to the surface, accompanied by the chlorophyll, albumen, etc., from which it cannot easily be separated.

I therefore proceeded thus:—I weighed 500 grains of extract, and diffused it through hot water, slightly acidulated with hydrochloric acid, then added 100 grains of strychnia solution, and made up the measure of the whole to 8 ounces. This was thrown on a plaited filter, which soon allowed half the fluid to pass. As the extract was not completely soluble, a little less than this was taken, exactly neutralized with ammonia, and then treated with 10 grain measures of volumetric ammonia and about half an ounce of oleic acid. The rest of the process was conducted as before described. I recovered in every case 80 per cent. and no more, notwithstanding the greatest care in manipulation. Quinine treated in the same way, yielded the same proportion. When ether was used as the solvent, precisely the same results were obtained, though the time occupied was certainly not shorter. On the whole, I am inclined to think the oleic acid process deserves attention.

I tried also to eliminate the alkaloid by animal charcoal. Mr. Cobb published a paper on this subject, in the 10th vol. Pharm. Journ., and Messrs. Graham and Hofmann used the process for detecting the presence of strychnia added by them to bitter ale. However I was less fortunate than they, and could not make the process answer. I am inclined to think the *kind* of charcoal had some influence, and that probably there are varieties of that substance that do not hold on so tightly to the alkaloids as the specimen I used. The alkaloid is separated from the liquid and united with (or destroyed by?) the charcoal with the greatest ease, and could it be as easily recovered by a change of solvent or of circumstances, no process of elimination could compare with it. Strychnia once absorbed, I could get no indication of, after boiling with rectified spirit, as Graham directs, with alcohol of various densities acidulated and not acidulated, with chloroform or acetic ether. With cinchonine I was not entirely unsuccessful, but recovered only 25 per cent. The question of the charcoals therefore deserves to be gone into, with a view of ascertaining whether or not they differ in kind as well as degree of efficiency.

The only other likely method that has occurred to me, is that by dialysis, a subject in the able hands of Dr. Attfield.

On the whole, I am disposed to think that the attempt to ascertain by analysis the remedial effect of an extract is never likely to be practically followed; it is far too troublesome, and besides, I think no method can be devised that will give an accurate result. It is difficult, as I have found, to recover the whole of the alkaloid when dissolved in pure water. I do not believe it possible without infinite pains to recover it from a confused mass of principles combined into an extract. A portion of the alkaloid may, in most cases, be expected to be combined with some form of tannin, or united with resinous or fatty substances, and although the menstrua of the chemist would probably fail to extract them, the stomach of a patient would not. Then again, no natural extract owes its virtues solely to the alkaloid it contains; neutral principles, the glucosides, resins, oils, and extractive, one and all play their part, and oftentimes not an unimportant one.

Again, the mere *amount* of alkaloid is insufficient,—its kind would also have to be ascertained. It is likely that no alkaloid is unaccompanied by its fellow of similar though unequal medical value. In every such case the mercurial compound, supposing iodohydrargyrate to have been used in the estimation, must be decomposed and a second estimate undertaken. It would probably be left to guess-work, for in the small way it would be impossible to bring each to the balance. Where then is accuracy? Gone. It may not be a bad test of the general goodness of an extract, to ascertain if it contains any alkaloid at all, for most of those bodies are readily alterable by bad manipulation. Such a course has been recommended by M. Lepage, of Gisors. But that could only be safely relied on when the source of the extract is known. How easy to add to a bad extract a few grains of alkaloid, no matter what, for the purpose of deception. In answer to a demand for extracts containing alkaloids, such a trade trick is not beyond the bounds of probability.

In order to isolate the alkaloid from the compound for the purpose of identification, I find it better to remove the iodine than the mercury. The opposite course has been recommended, but hydriodates of the alkaloids are generally very intractable, so I decompose them with acetate of lead or nitrate of silver. In applying the latter, it is not necessary, provided the iodohydrargyrate be recently precipitated, to dissolve it in alcohol. By merely acidulating the liquid with acetic acid in which it is suspended, and adding enough nitrate of silver (the limit may be ascertained by chromate of potass) to absorb all the chlorine and iodine, the alkaloid is obtained in aqueous solution in company with nitrate of mercury. This plan succeeds with the strychnia compound, which, being very sparingly soluble in boiling alcohol, is otherwise difficult of attack. Then by adding carbonate of potass and ether, or other solvent, the alkaloid is obtained in a state of purity. By the other method (removing the mercury by sulphide of ammonium, etc.) the yield is contaminated with, or consists entirely of hydriodate. I was for a long time deceived by the hydriodate of aconitina refusing to be decomposed by ammonia, and until I accidentally observed its reaction with lead, set it down for a resinoid.

Although beyond the proper limits of my paper, already I fear inordinately long, I cannot conclude without confessing that although I do not believe in volumetric or any other *chemical* testing of the strength of extracts, I am fully alive to the *necessity of ascertaining their degree of potency*. I am confident that many of the extracts in the market are comparatively valueless, and one remembers the dictum of Mr. Donovan respecting all the preparations of henbane.

Then, I say, try the physiological test. Systematize the assay of the poisonous extracts on the bodies of the lower animals, not cats or dogs,—they are too robust and suffer much,—but mice and birds, the "small deer" of the "varmint" class, who are easily obtained, very sensitive to poisons, and who finally must by this time have accepted killing by poison as a strictly natural death.

Weymouth.

REPORT ON THE PURITY OF COMMERCIAL POWDER OF OPIUM, IPECACUANHA, AND JALAP.

BY MR. F. M. RIMMINGTON.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

The samples were procured from different towns, and from different chemists in each town, and the mode of analysis adopted, though chiefly microscopical, includes the estimation of the ash. I have done this, not from a conviction that any slight variation in the amount of ash would be proof of sophistication, but from a belief that it might afford a sort of presumptive evidence, and also yield some fact of interest in such a series of analyses. The estimation of extractive matter, or active principle, has been altogether omitted, as tending only to indicate quality, which is not the question at issue.

Of the powders examined, it will be seen that ipecacuanha is least adulterated. This apparent freedom may arise from the difficulty of detecting a small amount of any earthy matter that may be clandestinely introduced. No. 5 is such an instance.

POWDERED OPIUM.

No.	Name of town.	Adulterated or otherwise.	Per cent. of ash.	
1	Norwich	Contains starch, wheat	6·5	
2	Norwich	Contains a little starch	5·5	
3	Norwich	Genuine	5·5	
4	Norwich	Contains much starch	5·5	
5	Nottingham	Contains a little starch	6·0	
6	Nottingham	Contains some starch	6·5	
7	Nottingham	Contains starch	6·0	
8	Bradford	Genuine	5·0	(authenticated)
		Average	5·8.	

The author regards the starch as having its origin in the opium as imported, having found it in macerating opium for tincture.

POWDERED IPECACUANHA.

No.	Name of town.	Adulterated or otherwise.	Per cent. of ash.	
1		The root coarsely powdered	2·5	(including meditullium)
2	Bradford	Genuine	3·0	
3	Lancaster	Genuine	2·5	
4	Norwich	Genuine	2·5	
5	Nottingham	Genuine?	7·0	
6	Nottingham	Genuine	3·7	
7	Nottingham	Genuine	3·5	
8	Nottingham	Genuine	3·0	
9	Norwich	Genuine	3·0	
10	Lancaster	Genuine	2·5	
11	Lancaster	Genuine	2·5	
		Average	2·87	(omitting No. 5).

The samples were not tested for antimony.

POWDERED JALAP.

No.	Name of town.	Adulterated or otherwise.	Per cent. of ash.	
1	Lancaster	Genuine	6·0	
2	Lancaster	Genuine	5·0	
3	Nottingham	Genuine	5·5	
4	Nottingham	Contains much woody fibre	3·5	
5	Nottingham	Genuine	6·0	
6	Norwich	Contains much woody fibre	4·0	
7	Lancaster	Genuine	6·0	
8	Bradford	Genuine, fine	5·5	(authenticated)
9	Norwich	Genuine	5·5	
		Average	5·64	(omitting Nos. 4, 6).

Bradford.

ON THE PREPARATION OF AN IMPROVED WINE OF IRON.

BY HARRY NAPIER DRAPER, F.C.S., AND MR. JAMES WHITLA.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

If an apology be needed for bringing before the Pharmaceutical Conference a note upon a subject which has been already accepted by one of its members, we would request that ours be found in the pharmaceutical interest of the subject itself, while at the same time we think it probable that the direction of our experiments may be different to that marked out by the gentleman who has especially undertaken the research. We wish, however, to occupy as little as possible the time of the Conference, and will state our results as concisely as possible.

We have endeavoured to effect in a simple and practical manner an improvement upon the formula of the British Pharmacopœia for iron wine. The present formula is as follows :—

Take of tartarated iron 160 grains.
,, sherry 1 pint.
Dissolve.

It has been pointed out by Mr. Squire that tartarated iron does not readily dissolve in sherry which is already saturated with bitartrate of potash, and that indeed, used in the above proportion, it will not all dissolve. We have not found this to be accurately the case. The potassio-tartrate readily dissolves in the wine, but part of it is almost at the same instant decomposed, forming a brown precipitate, which renders the solution turbid. This decomposition is apparently due to the action of the bitartrate of potash contained in the wine, and the separation of an acid tartrate of iron. If solution of potash be added to neutralization, the precipitate is at once redissolved and the solution becomes clear. In a mixture of spirit and water of the same alcoholic strength as the wine, the tartrate dissolves without any trace of this decomposition.

If after solution of the tartrate the wine be filtered, it will remain transparent for some time, but sooner or later it again invariably deposits, becoming turbid and unsightly.

In making these experiments, it was soon observed that the action of solar light affected in a very marked degree the permanence of the preparation. Kept completely in the dark, the wine could be preserved for some time without precipitation ; but if exposed to direct sunlight a deposit occurred in a few hours. In diffuse daylight the same change takes place more slowly. This is evidently due to the well-known deoxidizing action of solar light upon organic salts of iron, and is not, even as regards the potassio-tartrate, an original observation, the fact having been pointed out more than twenty years since by Sir John Herschel (*vide* Hunt's 'Manual of Photography,' third edition, p. 54). By exposure to light an insoluble prototartrate is formed, and if the solar action be prolonged, nearly the whole of the iron may be withdrawn from the solution.

In attempting to produce a permanent iron wine several salts of iron were tried, but that which afforded the best results was the ammonio-citrate. A solution of this salt in sherry in the proportion of one grain to each fluid drachm is, in the first instance, perfectly transparent. If it be exposed to the light a precipitate is produced as in the case of the potassio-tartrate, but it is considerably less in quantity, and requires for its formation much more prolonged insolation. On the other hand, if excluded from light, the wine thus prepared will retain its transparency for an indefinite period.

A preparation, however, which required complete protection from light could scarcely be said to be permanent, and our next aim was to discover some means of overcoming this objection. As the precipitate had been ascertained to consist of a ferrous salt, insoluble in the wine, it was evident that the addition of some substance which should prevent its precipitation by keeping it in solution would effect this purpose. After trial of several agents, we arrived at the conclusion that neutral *citrate of ammonia* was that best adapted to the requirements of the case. Many tentative experiments resulted in our being able to fix the proportion of this salt necessary to keep the solution transparent without imparting any disagreeable taste. The following formula affords a preparation which, in our opinion, leaves little to be desired.

Take of ammonio-citrate of iron 160 grains.
,, crystalline citrate of ammonia 60 grains.
,, sherry 1 pint.
Dissolve.

The wine thus prepared will of course contain in each fluid drachm one grain of ammonio-citrate of iron and three-eighths of a grain of citrate of ammonia. It is perfectly transparent, has no disagreeable taste whatever, and may be exposed to diffuse daylight without incurring the least liability to deposition, or indeed undergoing any apparent change, except that it becomes somewhat darker in colour after a time. This change in colour is of course produced by the reduction of the iron salt,—the alkaline citrate not preventing the deoxidation, but simply keeping the protosalt in solution. While, however, the alteration in tint cannot be considered of any practical importance, it may be quite prevented by keeping the wine in opaque vessels.

The direct action of sunlight produces in this wine a precipitate after a considerable time, but this is a crucial test to which the preparation is not likely to be often subjected. However, were it necessary to guard against even this cause of alteration, the increase of the proportion of citrate of ammonia would effectually do so, but it would be at the cost of rendering the wine somewhat unpalatable. Kept in an ordinary tincture bottle, and under the same conditions of light and temperature to which such preparations are usually exposed, a specimen prepared more than two months since remains without any sign of present or approaching alteration.

Dublin.

ON COMMERCIAL WINE OF IRON, WITH SUGGESTIONS.

BY FRANCIS SUTTON, F.C.S.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

That the preparation of this somewhat popular form of medicine has hitherto been variable and unsatisfactory is a fact which needs no other proof than may be obtained from an inspection of the various official formulæ given during the last thirty or forty years, or a cursory examination of samples of the wine obtained from different but thoroughly respectable makers. These remarks apply to the steel wine made previous to the introduction of the British Pharmacopœia.

For the purpose of ascertaining the variation to which the preparation was liable, even in the hands of the leading Pharmaceutical Chemists in London, the writer obtained samples from seven of the most prominent establishments in the month of January in the present year.

Five of these specimens were perfectly clear, two were slightly opaque in appearance,—no two samples were precisely alike in colour.

They were first examined by evaporation to dryness in a platinum crucible over a water-bath, the residue in each case being submitted to a temperature of 300° F. in an oven, to remove, if possible, all moisture. All the samples were operated upon at the same time, and therefore the results were comparatively reliable. After remaining in the oven five hours the capsules were removed, cooled under a bell-glass, and weighed. This was done with a view to find the quantity of sugar, etc., present in the sherry from which the respective specimens were made.

The next step was to burn off these residues till all carbon was destroyed, dissolve the oxide of iron remaining in the smallest possible quantity of dilute hydrochloric acid, reduce the peroxide to protoxide by zinc, then estimate the quantity of metallic iron present by a standard solution of permanganate of potash.

The weight of saccharine residue in each sample, together with the amount of metallic iron present, is shown in the following table :—

	Saccharine residue per ounce of wine.	Metallic iron per ounce of wine.
Sample No. 1.	23·84 grains.	0·31 grain.
" No. 2.	24·50 "	0·35 "
" No. 3.	14·22 "	0·70 "
" No. 4.	20·91 "	0·51 "
" No. 5.	51·27 "	1·76 "
" No. 6.	17·10 "	1·08 "
" No. 7.	28·24 "	0·43 "

Leaving out of the question sample No. 5, which was found to be made with tartarized iron, there is apparently a very close connection between the quantity of sugar present in the original wine and the amount of iron dissolved. The results obtained seem to point to the conclusion, that where the amount of sugar in the sherry is largest the amount of iron dissolved is, generally speaking, less than when a small proportion of sugar is present. It is of course a well-known fact that the presence of sugar retards the peroxidation of the proto-compounds of iron; but the probability is that in these cases the wines used were not of genuine composition,—deficient in natural acidity, and manufactured by boiling down the commoner kinds of must, adding sugar and brandy to bring up the taste and strength.

The sample No. 6 was made, I fully believe, from iron filings or wire, and not from any soluble salt of iron. This special sample was of bright appearance and possessed the fine aroma of first-class sherry, and as may be seen by the above analysis, contained more than three times as much iron as the average of Nos. 1, 2, 5, and 7, which all contained larger quantities of saccharine residue.

Considered in the light of ferruginous medicines, these latter samples are nearly worthless, and yet these were all doubtless made in good faith and strictly according to the directions of the London Pharmacopœia.

My experience as to the manufacture of steel wine from metallic iron leads to the conclusion that it is necessary to choose a light, sound sherry (ascertained to be free from excess of sugar by evaporating a specimen to dryness), and using clean iron filings in preference to wire, allowing at the same time at least three or four months' digestion, instead of one month.

With respect to the preparation ordered in the new British Pharmacopœia, there can be no doubt that it has the advantage over the old method in securing a more uniform amount of dissolved iron. The quantity it should theoretically contain is 1·45 grain per ounce, but from an examination of several samples prepared strictly according to the British Pharmacopœia, I find the average amount of dissolved iron to be 1·1 grain. The difference between each sample was very slight, the remainder of the iron being precipitated as a basic tartrate of the protoxide of iron, possessing a greenish-grey colour. The deposition of this substance is apparent immediately on adding the potassio-tartrate of iron to the wine, and apparently goes on slowly depositing through some time. This circumstance has given rise to the dissatisfaction expressed by many that the preparation is unsightly, and though filtered perfectly clear at first, will in a short time become muddy.

I regret that other occupations have prevented a strict examination of this deposit, but from the few experiments I have been able to make, I conclude it to be, as before stated, a tartrate of the protoxide. It is almost, if not entirely insoluble in water, and becomes brown on exposure to the air.

I believe the best method of rendering the steel wine prepared from the new formula uniform in appearance and satisfactory in every respect is to use a sound and strong sherry, and to digest it with the tartrate for a month at least, keeping the vessel in which it is contained at a medium temperature and somewhat loosely closed, so that a moderate accession of air may take place. By this means the, at first, insoluble deposit will slowly saturate the acids of the wine and become converted into the more soluble organic compounds of the peroxide of iron. Steel wine so prepared and kept has yielded me a thoroughly satisfactory preparation, when poured off from the deposit or filtered through good filtering-paper.

Norwich.

REPORT ON THE QUANTITY OF ALKALOID CONTAINED IN VARIOUS SPECIMENS OF CITRATE OF IRON AND QUININE.

BY MR. J. C. BRAITHWAITE.

(*Read at the Bath Meeting of the British Pharmaceutical Conference, Sept.* 1864.)

Having been engaged some time ago upon an examination of two or three specimens of this valuable medicine, prepared by makers of repute, I was surprised to find that the proportion of citrate of quinine contained in them was considerably less than the quantity stated on the label to be present; and being aware that my old pupil and friend Mr. T. B. Groves had undertaken to investigate this matter, I very recently communicated the results of my experience to him, and in reply received a suggestion that I should take this subject off his hands. This I consented to do, to the best of my ability, in the short time intervening before the meeting of the Conference.

I have since examined fifteen different samples of this medicine prepared by various makers, some of whom acknowledge their productions by the presence of their names on the labels, whilst others do not seem desirous of acquiring commercial repute by such a practice. In nearly every case, however, it is stated on the label that the article contains twenty-five per cent. of citrate of quinine.

The test that I have employed in this investigation is only a slight modification of that given in the British Pharmacopœia, which states that, "Fifty grains dissolved in a fluid ounce of water, and treated with a slight excess of ammonia, give a white precipitate which, when collected on a filter and dried, weighs eight grains;" and "the precipitate is entirely soluble in pure ether."

On the first appearance of the above Pharmacopœia, I prepared some of this citrate by the process therein given, and obtained from it by the above test between fourteen and fifteen per cent. of quinine.

As quinine is slightly soluble in excess of ammonia, and also in water, I endeavoured during the process to avoid using more of either than was absolutely necessary, and to accomplish this object I employed a graduated wash-bottle which emitted a very fine jet of water, by which means I was enabled to use the same quantity of water in each case, and no more than was absolutely required. In drying the precipitate, I found it advantageous to do so by simple exposure to the air at the ordinary temperature in the first place, and afterwards to complete the operation by means of the hot-air apparatus, otherwise the alkaloid was apt to fuse and penetrate through to the balanced filter.

At the commencement of my investigations I examined a specimen of citrate of quinine prepared by myself, so as to determine the quantity of alkaloid obtainable from it; this I found to be about sixteen parts in twenty-five, or sixty-four per cent., a quantity corresponding to the statement in the British Pharmacopœia.

The following are the results of my examination of different specimens of citrate of iron and quinine, arranged progressively from that containing the least amount of citrate of quinine to those most abounding in it.

No. 1 was obtained from the bottle of a ship's medicine chest and was of a yellowish-brown colour, having a slight olive tinge. When exposed to the air at a temperature of 60°, it did not absorb moisture. It readily dissolved in water, yielding a clear orange-brown solution, which had an acid reaction on test paper and possessed a most nauseous chalybeate taste and but little bitterness. On the addition of ammonia the quantity of precipitate obtained was exceedingly small, and adhered so closely to the filter that it could not be separated from it.

From three analyses of twenty-five grains each I obtained 0·35, 0·39, 0·39, mean 0·376, equal to 1·504 per cent. of quinine, or 2·35 per cent. of citrate of quinine.

This was almost entirely soluble in ether, yielding a pale-yellowish solution.

No. 2 consisted of bright golden-coloured scales with an olive tinge. Exposed to the air at a temperature of 60° it absorbed moisture, and ran into a dark-coloured, gum-like-looking mass. It dissolved very readily in water, yielding a yellow solution, which had an acid reaction upon test paper and was not quite clear. It possessed an exceedingly nauseous taste, being at first sweetish, then slightly bitter and very chalybeate. When ammonia was added, the quantity of precipitate thrown down was exceedingly small and adhered closely to the filter.

From three analyses of twenty-five grains each I obtained 0·4, 0·37, 0·37, mean 0·38, equal to 1·52 per cent. of quinine, or 2·375 per cent. of citrate of quinine.

This was almost entirely soluble in ether, yielding a pale-coloured solution. No name appears on the label, but the preparation is certified to contain 25 per cent. of nitrate of quinine.

No. 3 had a fine bright, golden-yellow colour. When exposed to the air at a temperature of 60° the scales adhered together, but did not become very damp. Dissolved very readily in water yielding a clear yellow solution, which had an acid reaction on test paper. Its taste was sweetish at first, and then more bitter and less chalybeate than either of the preceding ones. When treated with ammonia the quantity of precipitate was small, and on drying adhered so closely to the paper that it could not be separated.

From three analyses of twenty-five grains each I obtained 0·9, 0·95, and 0·95, mean 0·933, equal to 3·732 per cent. of quinine, or 5·831 per cent. of citrate of quinine.

This, when treated with ether, yielded a solution of the same colour as the preceding, and left only a small portion insoluble. No name appears on the label, but the preparation is certified to contain 25 per cent. of citrate of quinine.

No. 4 has a pale golden colour with a slight greenish tinge. When exposed to the air at a temperature of 60° it lost lustre, and the scales slightly adhered to each other. It dissolved readily in water, yielding a fine clear yellow solution, which had an acid reaction on test paper, and possessed a taste very similar to the preceding but slightly more bitter. When precipitated by ammonia the quantity thrown down was small, and on drying adhered so closely to the paper that it could not be separated.

From three analyses of twenty-five grains each I obtained 1·02, 1·05, and 1·02, mean 1·03, equal to 4·12 per cent. of quinine, or 6·437 per cent. of citrate of quinine.

This, when treated with ether, yielded a pale-coloured solution resembling the preceding, and left a small quantity of insoluble matter. No name appears on the label, but the preparation is certified to contain 25 per cent. of citrate of quinine.

No. 5 has a pale golden colour with a slight greenish tinge, much resembling No. 4. When exposed to the air at a temperature of 60° it absorbed moisture (but less readily than Nos. 2 or 6) and lost its lustre. It dissolved very readily in water, yielding a clear yellow solution which had an acid reaction on test paper and possessed a bitter and slightly chalybeate taste. The precipitate thrown down by ammonia, when dried, was of rather a light-brown colour and of a resinous aspect.

From three analyses of twenty-five grains each I obtained 1·18, 1·19, and 1·2, mean 1·19, equal to 4·76 per cent. of quinine, or 7·437 per cent. of citrate of quinine.

This when digested with ether yielded a brownish-yellow solution, and only a small trace of insoluble matter. No name appears on the label, but the preparation is certified to contain 25 per cent. of citrate of quinine.

No. 6 consisted of rather small golden-coloured scales, having a slight greenish tinge. Exposed to the air at a temperature of 60° it lost lustre, and became very damp. It dissolved readily in water, yielding a clear yellow solution which had an acid reaction upon test paper, and possessed a more bitter and rather less chalybeate taste than the preceding. The precipitate produced by ammonia had a whitish earthy appearance. From three analyses of twenty-five grains each I obtained 1·48, 1·52, and 1·5, mean 1·5, equal to 6 per cent. of quinine, or 9·375 per cent. of citrate of quinine.

This when treated with ether yielded a pale-coloured solution, and left only a small quantity of insoluble matter. Certified on the label to contain 25 per cent. of citrate of quinine.

No. 7 had a purer golden-yellow colour than either of the other specimens examined. When exposed to the air at a temperature of 60° it did not appear to attract any moisture. It dissolved very readily in water, yielding a clear yellow solution, which had an acid reaction on test paper and was not very bitter to the taste. The precipitate thrown down by ammonia was of a very white colour when moist, and light-coloured and sand-like when dry. Expect that this will be found to contain cinchonia, but time will not permit me to complete the examination for this paper. From three analyses of twenty-five grains each I obtained 1·83, 1·86, and 1·84, mean 1·843, equal to 7·372 per cent. of quinine, or 11·518 per cent. of citrate of quinine.

This, when treated with ether, yielded a pale-yellow solution, which has commenced to deposit crystals (quinidine I anticipate) and left a pretty good bulk of the precipitate undissolved. Name on the bottle, and the preparation certified to contain 25 per cent. of citrate of quinine.

No. 8 had a golden-yellow colour. When exposed to the air at a temperature of 60° it did not appear to attract any moisture. It dissolved readily in water, yielding a yellow solution which was not quite clear and had an acid reaction upon test paper. It was slightly sweetish to the taste at first, and afterwards bitter. The precipitate thrown down by ammonia was brown when dry, and difficult to remove from the paper. From three analyses of twenty-five grains each I obtained 2·32, 2·32, and 2·33, mean 2·323, equal to 9·292 per cent. of quinine, or, 14·518 per cent. of citrate of quinine.

This, when treated with ether, yielded a brownish-yellow solution, and left only a small quantity of insoluble matter. No name appears on the label, but the preparation is certified to contain 25 per cent. of citrate of quinine.

No. 9 occurred in rather small scales of a golden-yellow colour. Exposed to the air at a temperature of 60°, the scales adhered slightly to each other. It was readily dissolved in water, yielding a solution of a yellow colour, but not quite clear, and having an acid reaction on test paper. It was more bitter than the preceding, but not chalybeate to the taste. The precipitate by ammonia had a dark resinous appearance when dried. From three analyses of twenty-five grains each I obtained 2·8, 2·8, and 2·83, mean 2·81, equal to 11·24 per cent. of quinine, or, 17·56 per cent. of citrate of quinine.

This, when treated with ether, yielded a darkish-coloured solution, and left but a small quantity of insoluble matter. The maker's name appears on the bottle, and the preparation is certified to contain 25 per cent. of citrate of quinine.

No. 10 occurred in small scales of a brownish-yellow colour. Exposed to the air at a temperature of 60°, it underwent no change. It dissolved readily in water, yielding a clear orange-yellow solution which had an acid reaction on test paper. It was not chalybeate to the taste but more bitter than the preceding. The precipitate by ammonia, when dry, was dark and resinous. From three analyses of twenty-five grains each I obtained 3·07, 3·06, and 3·07, mean 3·066, equal to 12·26 per cent. of quinine, or, 19·162 per cent. of citrate of quinine.

This, when treated with ether, yielded a solution precisely like that of No. 9 as regards colour, and left but little insoluble matter. The label bears the manufacturer's name, and certifies the preparation to contain 25 per cent. of citrate of quinine.

No. 11 had bright golden-coloured scales, with a tinge of olive-green, and rather darker in colour than specimen No. 2. Exposed to the air at a temperature of 60°, it underwent no change. It dissolved readily in water, yielding a clear yellow solution, which had an acid reaction on test paper, and a bitter but not chalybeate taste. The precipitate thrown down by ammonia, when dried, was of a light colour and resinous appearance. From three analyses of twenty-five grains each I obtained 3·22, 3·24, and 3·25, mean 3·236, equal to 12·94 per cent. of quinine, or, 20·22 per cent. of citrate of quinine.

This, when treated with ether, yielded a solution a trifle darker in colour than the preceding, and left but a very small quantity of insoluble matter. Stated on the label to contain 25 per cent. of citrate of quinine.

No. 12 was of a bright golden-yellow colour and in nice scales. Exposed to the air at a temperature of 60°, it became somewhat damp and lost its lustre. It dissolved readily in water, yielding a yellow solution which was not quite clear, and had an acid reaction on test paper. Its taste was bitter but not chalybeate. The precipitate thrown down by ammonia was dark in colour, and difficult to remove from the filter when dry. From three analyses of twenty-five grains each I obtained 3·7, 3·65, and 3·69, mean 3·68, equal to 14·72 per cent. of quinine, or 23 per cent. of citrate of quinine.

This, when treated with ether, yielded a darkish-brown solution as in the preceding, and left only a small amount of insoluble matter. The name appears on the label, and the preparation is certified to contain 25 per cent. of citrate of quinine.

No. 13 was of a dark-olive colour with a golden tinge. It was unaltered by exposure to the air at a temperature of 60°. It dissolved in water with considerable difficulty, yielding a dull yellow solution which was not clear, and had an acid reaction on test paper. It possessed a bitter and nauseous chalybeate taste. The precipitate thrown down by ammonia was dark in colour and resinous. From three analyses of twenty-five grains each I obtained 3·72, 3·7, and 3·67, mean 3·696, equal to 14·784 per cent. of quinine, or 23·09 per cent. of citrate of quinine.

This, when treated with ether, yielded a brownish-coloured solution, and left a small quantity of insoluble matter. Prepared according to the British Pharmacopœia formula.

No 14 had a golden green colour and somewhat dull appearance. Was unaltered by exposure to the air at a temperature of 60°. It dissolved in water with difficulty, but more readily than the preceding, yielding a rather turbid solution, which on standing deposited a greyish sediment, and had an acid reaction on test paper, and an intensely bitter taste. It yielded a copious precipitate on the addition of ammonia. From three analyses of twenty-five grains each, and from one of fifty grains, I obtained 3·72, 3·7, and 3·73, from fifty grains 7·45, mean 3·72, equal to 14·88 per cent. of quinine, or 23·25 per cent. of citrate of quinine.

This, when treated with ether, yielded a brownish solution, and left but little insoluble matter. The name appears on the label, and the preparation is certified to contain 25 per cent. of citrate of quinine.

No. 15 occurred in very bright, fine golden scales, which remain unaltered by exposure to the air at a temperature of 60°. Dissolved readily in water, yielding a perfectly clear yellow solution, which had an acid reaction upon test paper, and a very bitter but not chalybeate taste. From three analyses of twenty-five grains each I obtained 3·96, 3·92, and 3·94, mean 3·96, equal to 15·84 per cent. of quinine, or 24·75 per cent. of citrate of quinine.

This, when digested in ether, yielded a brownish-coloured solution, and left a small quantity of insoluble matter.

I regret that time does not permit me to report on the presence or absence of the other cinchona alkaloids. Quinidine will, I think, be found to be present in more than one specimen, and I imagine from the quantity of white precipitate left insoluble in ether in No. 7, that the presence of cinchonine is highly probable in that sample. I must, however, defer a further notice to another time.

54, *Kentish Town Road, London, N.W.*

DEATH FROM ERGOT OF RYE.

On Thursday, Oct. 6th, the Borough coroner resumed his inquiry, at the Town Hall, Brighton, as to the death of Susan Kingman. The facts of the case, as elicited at the inquest, are as follows:—The deceased had been cohabiting with a Mr. Leapman, and becoming *enceinte* had endeavoured to procure abortion by taking large quantities of ergot of rye. Mr. Leapman, when he discovered what she was doing, desired her to discontinue the medicine and made her promise that she would, but as soon as his back was turned she repeated the doses. In consequence of this her health was brought to so low an ebb that on Sunday, the 25th of September, medical assistance was called in; but notwithstanding the greatest care on the part of Dr. Stephens, she died on the following Tuesday. So peculiar were the symptoms of her ailing, that Dr. Stephens refused to give Mr. Leapman a certificate that Miss Kingman died from natural causes. The same day Mr. Leapman left Brighton, and no one knew where he was gone, although it was rumoured that he had left the country. From information supplied by a servant in deceased's employ it appears that the medicine had been obtained from Mr. Garrett, chemist, Western Road, in large quantities, and in a lesser quantity of Mr. Johnson, North Street; and on examination these gentlemen said that they supplied it in accordance with a prescription given to them by deceased, and signed J. D. R. In the possession of Miss Kingman was a letter addressed to "My dear Susan," saying "how glad I should be to see you in town, and would meet you at any place by mutual appointment. If you could spare me a little money in stamps, it would be of infinite service to me just now, as I have been at a heavy expense in moving my family to London.—Yours very sincerely, J. D. R***r. Direct to me: Dr. Rym—, Chief Office, St. Martin's-le-Grand, London." The prescription was consequently supposed to have been written by Dr. Rymer, who formerly resided at The Dicker, near Chiddingly; and as it was stated that deceased died of irritant poison, and that ergot of rye, taken in large doses, would have produced the symptoms manifested, but would not act as an abortive, the inquiry was adjourned, in order that the attendance of Dr. Rymer and Mr. Leapman might be secured and further evidence obtained, but the attempt to serve a summons either on Dr. Rymer or Mr. Leapman failed.

At the adjourned inquiry, Mr. Thomas Stowell, an M.D. of the University of New York, and an M.R.C.S. of London, stated that he had on one occasion attended Miss Kingman, when he prescribed for her a decoction of *Linum catharticum* and compound rhubarb pills; but that if the prescription (the one dispensed by Mr. Garrett, chemist) had been brought to him, he should not have supplied the medicine, as he considered the ergot of rye dangerous. Mr. John Kemp, chemist, North Street, gave evidence as to the "custom of the trade" in dispensing such prescriptions. He had been in business fourteen or fifteen years, and if such a prescription as the one produced had been brought to him by a strange female he should have dispensed it. The prescription was as follows:—"℞ Tinct. Secal. Cornut. ℥ij, Ol. Menth. Pulegii ʒij, misce. Take one teaspoonful in water three times a day.—J. D. R."

Coroner—And supposing she was to come again and again, extending over a period of six weeks, would you supply her?—It might cause some little remark, but it is a medicine that is given in chronic diseases.

Coroner—What amount would you consider it negligent to supply?—Well, you see, it might be dispensed by different assistants, and therefore it is doubtful if we should have known it; if it had come to my knowledge that any one had applied for it to be made up six times in as many weeks, I should have considered it improper. A proper interval would be five or six days.

May I ask if in your experience a prescription of that kind, containing ergot of rye, has been given for chronic diseases?—Ergot and infusion of ergot are given in such cases.

Dr. Stephens—And would you supply it in such quantities for such a disease?—Yes.

Mr. Johnson—Would you not suppose that a lady calling on you repeatedly for bottles, had seen her medical attendant in the intervals?—Yes.

A Juror—Do you know the nature of it—do you know that it would produce death? —Yes, if taken in large quantities. No medical man would direct it to be taken week after week. If a female presented the prescription four or five times, I should ask her if she was taking it by direction of her medical man; and if she said, "No, he told me to take it, and I have taken it ever since," I should not dispense it.

A Juror—Do you know that ergot of rye is calculated to produce abortion?—Yes.

And yet you say you would supply it three or four times?—Yes, under circumstances such as I have named.

Sarah Harriet Sayers stated that she was in the service of Miss Kingman for six months; she had fetched medicine from Mr. Garrett's, and on one occasion Dr. Rymer came to see her mistress. The medicine she took made her very ill, and once she heard Mr. Leapman say, "If you take that medicine any more, I will never speak to youag ain."

Dr. Roberts, who was in court, here expressed his desire to give evidence—I reside at Burgess Hill. I have had great practice. Mr. Garrett was an assistant with me about two years, about fourteen years ago, when I carried on my profession at Sydenham. He was in the habit of largely dispensing the medicine ergot of rye in its different forms, and he was fully aware of its effects. He has known it to be given for three weeks together in as large or larger doses than have been mentioned; always in womb affections. He was then a most competent dispenser, and I had the most unlimited confidence him. I disagree largely with Mr. Kemp with regard to Secale producing death.

Coroner—Do I understand you to say that ergot of rye, taken week after week for nine weeks, would not produce death?—No, undoubtedly not. I should not look for death from it. Death would be from indirect causes.

A Juror—Do you mean that a person taking two or three bottles it would not produce death?—Yes.

Coroner—Have you read Dr. Taylor's work on poison?—Yes, and others as well. I do not think this would cause death. I entirely disagree with Dr. Stephens's evidence on the *post mortem* examination.

Then you come here, I suppose, to contradict his statement?—No, Sir, I come here out of friendship to Mr. Garrett.

A Juror—I know one of the first professional men in Brighton who prescribes ergot for consumption and chronic diseases.

Witness—I have known it to be given in half-ounce doses.

Dr. Stephens—Would the subject not vomit such a dose?—That would depend on circumstances. Some might vomit it, whilst others would not.

Coroner—Do you agree with Dr. Taylor when he says that small doses taken continually would cause death?—It would depend on what "continually" means,—whether it was six weeks or six months.

The coroner, after referring to the opinion volunteered by Dr. Roberts, said he thought it overbalanced by that of Dr. Stephens, and the recognized authority on these points, Dr. Taylor, and that death was caused by the destruction of the organs of digestion, and other organs, by the use of ergot of rye. If the jury were of opinion that the deceased took this drug for the purpose of procuring abortion, she was guilty of self-murder. So were those, if they did it knowingly, who supplied the *material*. Of Dr. Rymer's prescription they had only a copy, and there was no legal proof that the prescription produced was that he gave to deceased. Ergot of rye might be given to remove certain irregularities, and it might have been that Dr. Rymer gave deceased the prescription for this purpose, and that she had since made improper use of it. However, there was nothing in the case now which criminally implicated Dr. Rymer, although, no doubt, in the minds of the jury there was a strong suspicion, which Dr. Rymer certainly ought to remove for the sake of his own reputation. So much, then, as regards Dr. Rymer. Mr. Johnson only supplied the deceased with one bottle, and that was from the original prescription; therefore Mr. Johnson came out of the case with clean hands. So far as regarded Mr. Garrett, the case was more difficult to deal with. There was a conflict of evidence on this point. The girl Betsy Piercy said she several times fetched medicine from Mr. Garrett's, and on one occasion she said she had to ask him for the pills. She further said that she was in the employ of the deceased nine weeks, and that a fortnight after she went there she went to Mr. Garrett's and asked for "Mrs. Kingman's medicine," so that would show that deceased had taken the medicine seven weeks before she died. Then they had the evidence of the girl who was in deceased's employ before Betsy Piercy, and she said that a month before she left she went and fetched the medicine from Mr. Garrett's, so that they had it in evidence that deceased had taken this medicine for eleven weeks. Then, according to Mr. Garrett's own statement, he supplied her with four bottles before the 20th of August, and one since, making altogether five bottles. Now, the question they had here to consider was—did Mr. Garrett know that she required this for the purpose of procuring abortion? If they thought he was merely supplying the medicine under the direction of a medical man, they could not find him guilty of carelessness; but if, on the other hand, they thought that the practice of supplying such drugs was improper, they might express their opinion to that effect, although it would form no portion of their verdict.

The jury returned a verdict of *felo de se*, appending to it that they thought greater precaution should be used by chemists in dispensing such deleterious medicines.

Referring to the above case, a "Dispensing Chemist," in a letter to the 'Brighton Herald,' October 8, observes:—"There are but few chemists who, in the course of their career, have not dispensed similar prescriptions. In my own knowledge, a prescription containing 'ergot of rye' has been continually dispensed for a lady for three years, and in another case a lady took, three times a day, for several weeks, a dose of ergot half as strong again as that ordered in the prescription dispensed by Mr. Garrett for Miss Kingman.

"The jury forgot the fact that the chemist cannot know *all* the circumstances connected with any prescription that may be brought to him for dispensing; his duty begins and ends with the prescription, and although, thanks to an advanced intelligence in the ranks of our profession, there are few that are unacquainted with the doses and properties of the medicines we dispense, it is not our province to check the medical man in his written orders; the thousand little cares and anxieties that are entailed on us in carefully carrying out our duties are sufficient sources of responsibility without adding another that strictly belongs to the doctor. Should we refuse to prepare medicines duly (so far as we can judge) authorized by a medical man, we should only be adding to our already numerous responsibilities."

The 'Medical Times and Gazette,' in commenting on the case, gives the evidence of Mr. Stowell, who was described at the adjourned inquest as "an M.D. of the University of New York, and an M.R.C.S. of London," as that of a *chemist*, and triumphantly observes,—"We desire to hear the pharmaceutical opinion of this case officially, and meanwhile say, Take your line and keep to it. If you are to prescribe, please to study medicine, so that there may be no chance of giving *Linum catharticum* to pregnant women."

MEDICAL AND PHARMACEUTICAL RESPONSIBILITY.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The serious responsibility of medical general practitioners and pharmaceutists, revealed by the result of the case against Messrs. Clay and Abraham, is sufficient to point out the expediency of carefully scrutinizing charges of error that may from time to time be made against dispensers of medicine, and of distinctly recording cases where fraud is either proved or suspected on the part of those who make the accusation.

With this view, not finding any record of the case in the 'Lancet' or the 'Pharmaceutical Journal,' I beg to forward you the outline of what was proved at an inquest held at Finchley, by the late Mr. Wakley, in the beginning of the year 1855, as follows:—

On the 16th of December, 1854, the driver of the Finchley mail went into the open surgery of Dr. Niell, of Aldersgate Street, and asked for four doses of Epsom salts. There were two assistants in the surgery, one of them a student at St. Bartholomew's Hospital. Finding that no salts were put up and that the driver was pressed for time, they *jointly* occupied themselves in weighing and wrapping the salts, *sealing the packages with the surgery wax*. Shortly afterwards they were accused of having supplied oxalic acid instead of Epsom salts, as a person at Finchley who had sent the driver of the mail for the salts died from having taken the contents of one of the packages, and the three remaining packages were proved to contain oxalic acid. After repeated adjournments of the inquest, it was established that the packages left by the deceased had been resealed by wax *unlike* that kept in the surgery, that he had just previously bought half a pound of oxalic acid (which he was in the habit of possessing for trade purposes), and that his life was insured; moreover, in the folds of the wrappers of the three packets so left containing the oxalic acid, *were found the crystals of Epsom salts*. The jury returned a verdict of *Suicide*.

The facts here narrated can be easily proved by reference to the testimony of those who appeared at the inquest.

The foregoing case is important, because if it again occurred in a surgery or a chemist's shop to-morrow, the cunning which threw the onus of disproving a mistake upon those supplying the medicine might be repeated, and unless good fortune enabled a practitioner to show the fraud, his assistant would probably be tried for manslaughter and he himself possibly ruined by a monstrous fine.

It seems to me the more necessary that the Finchley case should be brought before your readers, on account of a passage I find in Professor Taylor's "Report on Poisoning," printed in the last issue of your Journal, as follows :—

"Several cases have come to my knowledge in which oxalic acid has been retailed in place of Epsom salts. In one of them, which occurred in London some years since, a man was sent to the shop of a respectable druggist for four ounce packets of Epsom salts. He was served with four packets, labelled, as usual, 'Purified Epsom Salts.' In the evening, the gentleman who had sent for the salts took the contents of one of these packets; he was seized with the usual symptoms of poisoning by oxalic acid, and died in a few hours. I examined the contents of the stomach and found oxalic acid therein, and I also found that the three unopened packets contained oxalic acid, labelled as above described."

Now if these remarks in Dr. Taylor's report refer to the Finchley case, they require to be supplemented by a notice of the fact that a verdict of 'suicide' was returned by the jury who investigated it.

With Professor Taylor's suggestions that none but educated persons should be allowed to vend poisons I for one heartily concur, so far as restriction is possible (I confess I see a difficulty in forbidding a colourman to supply white lead to a painter or the like), and I firmly believe that an improved Pharmacy Act, placing all existing dispensers of medicine now in business (who are not qualified medical men) upon a register, and compelling their successors to pass the examination of the Pharmaceutical Society, would be the best obtainable security for the public. It would be advisable, no doubt, to provide that, for the purposes of legislation, a schedule of articles to be deemed poisons should be drawn, and the sale of these and the dispensing of prescriptions restricted to apothecaries and *bonâ fide* chemists and druggists at present in business, as well as to those who may be duly examined hereafter.

It may be as well also to call attention to the following quotations from Professor Taylor's report :—

"A characteristic feature of all fatal errors in dispensing or vending medicines is the positive denial, as a rule, that any mistake has been made."

"This strong denial of a mistake from inattention or carelessness in face of facts which prove that a mistake must have been made, has, in more than one instance, led to unfounded charges of murder against innocent persons who have had the care of children."

"There is also another source of mischief which may arise from these mistakes. As a dispenser acting *bonâ fide* is never aware when a mistake has been made, and almost always denies it in the strongest language, it follows that those who have been in attendance up to the last hour are exposed to a false accusation of administering poison. If poison is found in the body or in the medicine, this is considered of itself a sufficient proof of the charge; and even in the absence of motive or moral circumstances will not always suffice to show the charge is groundless. The proof of the mistake, if denied, will in general rest upon presumption. A false charge of murder arising out of careless dispensing is easily made and hard to be disproved, as there can rarely be immediate access to the bottles or drawers of a shop to establish the fact upon undeniable evidence."

Surely the learned professor is here rather hard upon general medical practitioners and pharmaceutists.

Does not Mrs. Gamp, redolent of snuff and gin, often find her way in a half-fuddled state to the surgery of a general practitioner or the shop of the chemist? Is it so very certain that when engaged in unfurling her umbrella she never puts down the parcel that has been given her and takes up another? Is it so very clear that she is more unlikely to make a mistake than a practised dispenser? If so, is *she* less likely to make a "positive denial" than he? That "false charges" are "easily made and hard to be disproved" is unfortunately too true. But surely the compounder of medicines may cite this on *his* side also. If he is to have the risk of imprisonment, and his employer (be he a general practitioner or be he a druggist) the chance of having to pay heavy damages, he will probably be found to claim the right of other Englishmen and ask to be deemed innocent of offence until proved to be guilty,

I am, Sir, yours obediently,

30, *Bucklersbury, October*, 1864. B. B. ORRIDGE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Amongst all the suggestions for the regulation of the sale of poisons, nothing is said about a registration fee to be charged by chemists who are at the trouble of entering in their poison-book all sales of arsenic, etc. The process involves both time and trouble, and the remuneration most frequently ranges from one penny to threepence.

A legalized fee of one shilling would not be excessive, and would, I think, meet with little opposition from the followers of our craft. All registrars are rewarded either by salary or fee, and why should druggists be made an exception to the rule?

Yours respectfully,

Doncaster, October 30, 1864. E. H. W.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—In your Leader on "Pharmaceutical Responsibility," in the Pharmaceutical Journal for the present month, you say, "There will still be the reflection that an accidental error may entail upon the most careful a ruinous penalty," and ask, "Are there any means by which this painful reflection may be dispelled or relieved?" I do not know what plans may suggest themselves to others, but it has occurred to me that one of the simplest would be at once to form a Mutual Insurance Society, the object of which should be to provide a fund available for defraying the penalty incurred, should any of the insured be so unfortunate as to incur one through inadvertently supplying a wrong medicine, as in the case of Messrs. Clay and Abraham.

One of the first things a careful man will do after commencing business will be to insure his stock and furniture in a good fire-office; he then feels that though a fire would be a terrible calamity, causing a great interruption of business, still he would not be entirely ruined as he might have been had he not insured.

As the law now stands, every druggist in the kingdom is exposed to a far greater danger than that of fire. No man is able to say he shall not make a mistake. I believe the fear of so doing is a constant source of the greatest anxiety to many men. A mistake may be fatal, the penalty may be great, and the druggist who after years of perseverance may have gained the confidence and respect of his neighbours, and who is occupying a respectable position, may in a few days be reduced to absolute beggary. Many a druggist would be utterly unable to pay damages of a thousand or fifteen hundred pounds if awarded, and would have to part with everything he possessed to make up the sum, and what then would be his position? his name would have been published throughout the country, and few would be willing to trust him. He may have dispensed thousands of prescriptions correctly, given unremitting attention to his business, but in the case of a fatal mistake all this would be forgotten by the public generally.

The druggist who has assistants or apprentices is in a still more dangerous position than the man who manages his business alone, as he is evidently liable to a heavy penalty should a mistake be made by any of them. I do not know how far the Council of the Pharmaceutical Society can move in this matter, but I should be glad to see them taking some active steps. I think it would be necessary to demand an entrance fee so as to raise a fund which should be at once available, but that afterwards a very small annual subscription will be necessary, as I sincerely hope that no subscriber will ever have the misfortune to seek help from the fund; for as it is better to pay to a fire office for a lifetime and not have a fire, so will it be greatly to the advantage of a druggist never to have a mistake in his establishment.

I merely throw out the suggestion, leaving it for others to mature plans, or propose some scheme which shall more effectually relieve those engaged in dispensing prescriptions from *one* great source of anxiety.

I am, yours respectfully,

Bewdley, Sept. 7, 1864. ROBERT NEWMAN.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In relation to the late case at Liverpool, I beg to offer one suggestion that seems to me the only one, if rightly acted on and adopted, that can meet the difficulties into which Lord Campbell may possibly place any of us. It is this, that all the members of our Society, and I would add all dispensing chemists, at once agree to insure against accidents which, with the greatest care, may yet occur to any of us.

I care not what machinery is adopted, provided a *bonâ fide* result is obtained. A very small sum per annum would, I trust, be quite adequate for our purpose. An actuary may assist us in ascertaining the amount probably required from each subscriber.

Permit me, whilst writing on this subject, to earnestly press on my brother dispensers how much more may be done in the way of prevention of accidents in our business avocations. My own practice for very many years has been, first, so to dispose of the situation of my bottles as to render a mistake more difficult. In the next place, I always place the word "poison" on bottles of that nature. And, lastly, I have for a long time selected one drawer labelled "poison" for the more active poisons, such as strychnine, morphia, etc. Arsenic and corrosive sublimate I place entirely on an upper shelf, where it is some trouble to get at.

And now, Sir, I must ask, are these gentlemen at Liverpool to bear the brunt of this misfortune in the payment of nearly £2000 in addition to what they have suffered already? I do trust that for once the whole of their brethren, and all the chemists in the kingdom, will unite to defray the damages and costs of this civil action, without losing sight of that insurance fund which I hope to see immediately begun. I need hardly say I shall gladly subscribe to both.

I am, Sir, yours respectfully,

Exmouth, 8th September, 1864. SAMUEL THORNTON.

DISPENSING DEPARTMENT.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—In the Journal for the present month you have inserted a casual remark made by myself at the Pharmaceutical Conference at Bath on the above subject.

In chemists' shops in the country, where the "oil and colour" and other trades are carried on, I can quite understand why a "dispensing department" should be maintained separate from the dirt and confusion of the connected business.

A "dispensing department" seems to me always to imply that other business is carried on in the establishment besides dispensing. Now, as regards the *retail* of a strictly pharmaceutical chemist, I have yet got to learn why the pennyworth of "Epsom Salts," or of "Pil. Ruf.," or of "Red Precipitate Poison," etc., should not emanate from the "dispensing department" as well as the most elaborate prescription; and where the *dark* part of the back of the shop is labelled "dispensing department," I would propose altering the title to "*Patent Medicine Department*," as a dark place well suits the "*arcana fœtida;*" and although "*patent*" may literally mean "*open*," yet, in this case, the name appears to be applied on the old principle, *Lucus a non lucendo.*

As this is a practical subject, perhaps these few remarks may not be inappropriate. A scientific paper could scarcely be expected from an old Member, who, instead of passing an examination, has simply the honour of having his name inserted among the "founders" of the Society in the Journal for 1841, and who still retains his name on the list.

I am, Gentlemen, your obedient servant,

JOSEPH LEAY.

Chilcompton, Bath, October 6, 1864.

THE CASE OF ATTEMPTED CRIMINAL ABORTION AT BRIGHTON.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I would call your serious attention to a garbled report in the 'Medical Times and Gazette' of the recent case of criminal abortion in this town. The above Journal states, "The practitioner who gave it alleged that it was for a bronchial affection." Now he made no such allegation with respect to the prescription, but stated in a letter (evoked by one sent to him by the police here, to be left at the General Post Office, London, his whereabouts not being known) that he attended the woman two years ago for a bronchial affection. Now this is merely an evasive answer; for "the practitioner," a Dr. Rymer (which name the 'Medical Times and Gazette' does not mention), called on Mr. Garrett, according to his evidence, and authorized him to prepare the prescription.

This Dr. Rymer was not to be found at the time of the inquest, for obvious reasons.

The 'Medical Times and Gazette' also suppresses the fact that a letter was found on the woman, evidently from Dr. Rymer, begging for a few postage-stamps and asking for an assignation in town. This I consider the most suspicious part of the evidence.

The 'Medical Times and Gazette' has made another slip in calling Mr. Stowell a chemist, for he never was such, but is a M.R.C.S.; and therefore the censures they lavish on the chemists and counter-prescribing, and Mr. Stowell's "criminality" in administering *Linum catharticum* to the woman, really apply to the medical profession, and not to the chemists. It is amusing to see the worthy journalist blindly scourging his patrons.

I enclose a circular which this worthy (Dr. Stowell) has issued after passing the colleges. It commences thus:—"I apprise my patients and others that I have retired from the duties at St. Bartholomew's Hospital, which for three years and a half have engaged my attention, and taken me from home practice, etc. I am, etc., Thos. Stowell, Member of the Royal College of Surgeons, England."

In quoting "Thos. Stowell's" evidence, the 'Medical Times and Gazette' states that he showed superior knowledge and said, "WE have better remedies to produce the desired effect" (or to that purpose). Now although Mr. Stowell is a M.R.C.S., the WE here means the "Eclectics," for Mr. Stowell practises as such.

Trusting that you will insert the above remarks in your next issue, and that your readers will excuse any slight errors, as I have not the papers before me,

I remain, yours obediently,

C. BERRY, *Chemist.*

Brighton, 41, *Elm Grove*, *Oct.* 18.

TEST FOR METHYLIC ALCOHOL.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—My attention has been called to the abstract of a paper by Mr. John Tuck, on "*A Test for Methylic Alcohol in the presence of Ethylic Alcohol,*" which appeared in your report of the proceedings of the Pharmaceutical Conference held at Bath. As the paper referred to seems to have contained some singular omissions, I trust you will give me the opportunity of correcting them, since they affect me personally to some extent.

I was not a little surprised to find that the process of Mr. Tuck for detecting "Methylic Alcohol"* is essentially, and in fact, the same as that which I proposed and fully published early last year, for the detection of "wood spirit;"† but Mr. Tuck appears to be utterly oblivious of my previous investigation, or has perhaps forgotten to mention the source of his inspiration. How the former could have been the case I am at a loss to conceive, as my paper was fully published during the year in the 'Pharmaceutical Journal' and 'Chemical News,' in addition to other notices in many British and foreign scientific periodicals.

In but one unimportant point does Mr. Tuck's method differ from mine, and that difference consists in the employment of an alkaline solution of double iodide of potassium and mercury, instead of dilute solution of bichloride of mercury, with subsequent addition of caustic potash as proposed by me. The difference, then, exists only in name but not in fact, as the result is the same in both cases. Mr. Tuck has even gone further, and explicitly stated that the reaction of wood spirit with the mercurial salt "he has found" to be due to the presence of *acetone*,—a fact likewise dwelt on in my paper. So far as I can glean from your abstract, the same want of originality holds throughout the details of Mr. Tuck's method. I believe therefore that I am warranted in claiming Mr. Tuck's discovery (?) of a test for wood spirit as my own.

Before concluding, permit me to observe, in reference to the remarks of Mr. Reynolds, of Leeds, on my test for methylated spirits, that without claiming absolute immunity from error for it, yet *if used as described in my paper* its indications will be found much more reliable than Mr. Reynolds supposed, since I only rely on its evidence when three facts have been established, viz. 1st, the re-solution of the oxide of mercury by excess of potash in the presence of the suspected spirit; 2nd, the production of a yellowish-white precipitate on long-continued boiling of the alkaline solution; and, 3rd, the formation of a similar precipitate on supersaturating the excess of potash with

* The author states that the reaction is due to *acetone* ! !

† The term "wood spirit" is used throughout my paper in its ordinary generic sense.

acetic acid. My experience in the practical application of the test rests on the experimental examination of a number of pure medicinal tinctures, against the same samples purposely adulterated with methylated spirit. Working on this basis, I at the time examined many tinctures then in the market, and obtained such indications as to lead me to conclude that "methylated spirits" had been used in the preparation of certain samples, while others were pure. Apologizing for so far trespassing on your space,

I am, Sir, yours, etc.,

Dublin, Oct. 15, 1864. EMERSON J. REYNOLDS.

MEDICAL TITLES.

Several cases have lately been brought before the magistrates, of alleged infringements of the Medical Act, of which the following are examples:—At the Thames Police Court, Mr. Fentiman, a chemist, druggist, and medicine vender, of No. 2, Upper East Smithfield, near the Royal Mint, appeared to answer a summons taken out by Dr. Wills, a registered medical practitioner, of No. 22, Upper East Smithfield, which charged the defendant with falsely pretending to be a surgeon.

Mr. Butler Rigby, a barrister, instructed by Mr. Robertson, solicitor, opened the case for the prosecution, and said this was a case under an Act to Regulate the Qualifications of Practitioners in Medicine and Surgery. Dr. Wills had purchased a practice at a considerable expense, and was a properly qualified practitioner. The name of Dr. Wills was in the 'Medical Register.' The complainant's practice had been greatly interfered with by the defendant, whose bills were given away opposite to and near the complainant's surgery, and had even been put into the hands of his patients. The defendant, who was not a regularly qualified medical practitioner, called himself a surgeon in his shop bills and advertisements, which would be produced. He had only in addition to put in the 'Medical Register' for the present year, in which the defendant's name did not appear, and the case was made out.

The Register was put in and received as evidence, and Mr. Henry Carver, a commission agent, said he went to Mr. Fentiman's shop on the 15th and purchased twopennyworth of sweet nitre and threepennyworth of rhubarb. The defendant gave him a printed bill in which he was described as "Mr. Fentiman, surgeon, dentist, and chemist, No. 2, Upper East Smithfield, next the Royal Mint, Tower Hill."

The defendant, in reply to the charge, said if he had done wrong he was very sorry for it. He was not aware it was wrong to call himself a surgeon, for he had carried on the practice of the healing art for twenty years.

Mr. Paget said there was a decision of the Court of Common Pleas in a case of this kind in 1860. That case seemed to run on all-fours with this, or nearly so. The Court of Common Pleas on the facts decided that there were no grounds to sustain a conviction. A man called himself a surgeon, and he was not registered. It was the same here. He did not think he should be justified in convicting, and must dismiss the case.

Mr. Rigby asked the magistrate to adjourn the case, which was one of great importance. It was accordingly adjourned for a week, and was still further deferred, the defendant promising not to use the title of surgeon.

MARLBOROUGH STREET.—Mr. Francis Bearnard, surgeon-chiropodist to the Royal Family, 59, Regent Street, again appeared to answer a summons for using the word "surgeon" on his door, in contravention of the provisions of the new Medical Act.

Mr. W. Tilley, of Beaconsfield, Bucks, representing the Medical Council of Education and Registration, appeared in support of the summons; and Mr. Lewis, jun., of Ely Place, appeared for Mr. Bearnard.

On the previous occasion it was proved on one side, and admitted on the other, that the words "surgeon-chiropodist" were on the defendant's door-plate; that the defendant was not a surgeon in England, nor was he registered as one of the medical profession.

Mr. Tyrwhitt said yesterday,—I have considered this case, and it appears to me that "surgeon," though prefixed to "chiropodist," cannot be treated as mere surplusage, but must have a meaning. That meaning must be measured, not in the narrow sense in which knowing Londoners, experienced in vain pretension, and in the steps of medical rank, might take it, but by the general acceptation which the great body of mankind, passing the defendant's door-plate, would ascribe to the words used there. I think, on the whole, that these words would convey to them that a surgeon, duly qualified and registered as such, practised at the house in question as a chiropodist. Taken to be such a surgeon, he would command more confidence with those who sought his aid as a chiropodist; and not only that, but he might naturally be consulted by them in surgical matters beyond the mere treatment of corns. We must allow something for the craving after small titles which is so widely spread at present. The corn-cutter is restless until he writes "chiropodist," and next, from fear of so much Greek not being understood, dubs himself surgeon at all hazards. On the whole, if the defendant will remove from his door-plate and cards the word "surgeon," I might consider as to mitigating the penalty, which is £20, and in that hope would adjourn my decision till this day week. But if the defendant requests me to grant a case for the opinion of a superior court, I will do so. In that case it will be needless to adjourn the case, and I fine him £20.

Mr. Lewis, jun., said since the last hearing Mr. Bearnard had been to the Medical Council, and the secretary had informed him that they were not initiating the complaint.

Mr. Tyrwhitt said he had nothing to do with the Medical Council.

Mr. Lewis, jun., said, if Mr. Bearnard took a case to a superior court, he had a right to know whether Mr. Tilley was a responsible person. Mr. Bearnard had been called upon by several medical men, who had expressed their distaste at the proceedings.

After some consultation between Mr. Lewis and Mr. Bearnard, Mr. Lewis said, with all deference to the judgment just delivered, his client would take a case, and Mr. Bearnard would at once enter into the requisite sureties. Subsequently the magistrate said he felt that there was so much doubt about the matter that he should not enforce the penalty, and he would not advise Mr. Bearnard to alter his plate.

A summons was also taken out against Mr. M. C. Rogers, dentist, of New Burlington Street, "for falsely pretending to be a surgeon;" but it was proved that Mr. Rogers had passed the hospitals in Paris as a qualified surgeon, but he practised only as a dentist. It appeared that the Medical Council had ignored these proceedings against Mr. Rogers, stating that they were not taken by their advice nor at their expense.

OBITUARY.—THOMAS HERRING.

We have to record the death of one of the oldest members of the drug trade, an original promoter, and one of the most active and zealous supporters of the Pharmaceutical Society. Mr. Thomas Herring was born in Norwich on the 1st of January, 1785. He was apprenticed to Mr. George Sothern, of that city, in 1801, and at the end of his apprenticeship in 1806 he came to London and obtained an engagement with Messrs. Kirk, Hearon, and Co., in Bishopsgate Street, with whom he remained until the beginning of 1808. In this year he married Anne Rogers, the only child of Nathaniel Rogers, a wealthy dyer. About the middle of 1808 he commenced his career in business on his own account, having purchased the freehold of premises No. 8, Barbican, and invited his brother, Thrower Buckle Herring (at that time living with a bombazine manufacturer at Norwich), to join him. The new firm soon met with considerable success, and in 1815 they moved to more extensive premises at 40, Aldersgate Street, where the business has been carried on ever since. All the arrangements were provided here for a first-class wholesale drug business. There was ample room at that period for improvement in the preparation of medicines, and especially of those sold by wholesale druggists. The whole class of powders were usually prepared in an imperfect manner, and were often adulterated to an enormous extent. Medicinal extracts were also very imperfectly made, and in fact pharmacy was altogether in a low state. There were, no doubt honourable exceptions to the then existing general condition of the drug trade, but these were mostly in the retail department. Dispensing chemists who were anxious to perform their duty conscientiously made their own preparations, even to the powdering of many drugs, which of course was done with the pestle and mortar. Herring's house was soon brought prominently into notice by the introduction of a new class of powders, for the production of which they had fitted up very powerful and efficient drug-grinding apparatus. It was a new thing at that time for a wholesale druggist to have a drug-mill on the premises capable of producing all the vegetable and other powders on a large scale. Such work had been invariably done by a class of men called "drug-grinders," who were not particularly noted for the production of good and genuine powders. Herring's vegetable powders, such as rhubarb, jalap, bark, ipecacuanha, etc., while they were guaranteed to be genuine, were very different in appearance from any powders previously supplied for use in medicine. They were fine, soft, impalpable, bright-looking powders, such as could not be produced with the pestle and mortar. This class of powders has subsequently replaced entirely the comparatively coarse and dull-looking powders previously used. To Thomas Herring was certainly due the introduction of a great and important reform in this department of pharmacy. Nor was this the only class of preparations for the improvement of which active measures were adopted at 40, Aldersgate Street. The reform which had commenced there, and was first made apparent in the vegetable powders, soon extended to other houses and other preparations, and the improvements thus progressively developed continued for many years. When, at a later date, pharmaceutical reformers united their efforts for the establishment of the Pharmaceutical Society, a great change had already been effected in the state of the drug trade, but this was accomplished by the exertions of isolated individuals ; it remained for more extensive and important reforms to be brought about through the combination of the leading houses, both wholesale and retail, which took place in 1841. Among the active and zealous promoters of this Association was Thomas Herring. He was elected a member of the first Council of the Pharmaceutical Society, and continued to serve the Society in that capacity up to the time of his death.

He was a regular attendant at the meetings, and took a warm interest in the proceedings. In 1851 he was elected President of the Society; about this time he gave evidence before a Committee of the House of Commons in favour of Mr. Bell's Pharmacy Bill, showing the great abuses which had existed in the drug trade and the benefits which had resulted from the operations of the Pharmaceutical Society. The zeal he manifested in the cause to which he had devoted himself never flagged to the last, and the influence he exercised in the wholesale department of the trade was often felt to be of much value.

As a man of business, Mr. Thomas Herring was exceedingly active and possessed considerable energy. For twenty-one years after the commencement of his career he continued to make his weekly business visits among the chemists and druggists of London, making what he called his town or London round on foot, and this, which was performed in the course of every week, involved the walking of upwards of 112 miles. For forty-one years he never omitted his annual Dublin and Belfast journey. On the 23rd of last August, being the day after his return from his forty-first visit to Ireland, he was attacked with diarrhœa, which ended in his dissolution on the 27th of September, when he had nearly completed his eightieth year. He was buried in the family vault at Weybridge church.

BOOKS RECEIVED.

Elements of Materia Medica, containing the Chemistry and Natural History of Drugs, their Effects, Doses, and Adulterations; with Observations on all the New Remedies recently introduced into Practice, and on the Preparations of the British Pharmacopœia. By Dr. William Frazer, Lecturer on Materia Medica to the Carmichael School of Medicine, etc., etc. Second Edition. London: John Churchill and Sons, New Burlington Street. Dublin: Fannin and Co. 1864.

Elements of Chemistry, Theoretical and Practical. By William Allen Miller, M.D., LL.D., etc. Part II. Inorganic Chemistry. Third edition, with additions. London: Longman, Green, Longman, Roberts, and Green. 8vo, pp. 947. (From the Publishers.)

Skin Diseases: their Description, Pathology, Diagnosis, and Treatment. With a copious Formulary. By Tilbury Fox, M.D. Lond., etc. London: Robert Hardwicke, 192, Piccadilly. 8vo, pp. 315. 1864.

TO CORRESPONDENTS.

Persons having seceded from the Society may be restored to their former status on payment of arrears of subscription and the registration fee for the current year.

Those who were Associates before the 1st of July, 1842, are privileged (as Founders of the Society) to become Members without examination.

Wanted.—Copies of the 'Pharmaceutical Journal' for May, June, July, and August, 1852 : full publishing price given. Address Mr. Bremridge, 17, Bloomsbury Square, W.C.

J. J. (Wolverhampton).—The usual dose of phosphate of ammonia is from 5 to 10 grains. It is often combined with carbonate of lithia in cases of gout.

Chmicus (Aberdare).—(1.) Apply by letter to the Secretary of the College. (2.) Registered Apprentices of the Society are supplied with the 'Pharmaceutical Journal' free. (3.) The July number commences a volume.

J. M. (Crediton).—Gray's 'Supplement to the Pharmacopœia,' by Redwood, last edition, price 22*s*. It may be obtained through any bookseller.

Y. N.—"Kreuznacher bittern" is the salt obtained by evaporating the Kreuznacher water.

Photo (Leicester).—*Negative Collodion*: Purified Ether, sp. gr. ·720, 5 drachms; Purified Alcohol, sp. gr. ·820, 3 drachms; Soluble Pyroxyline, 3 to 6 grains; Soluble Iodide of Ammonium, 3 to 4 grains. (*Hardwich.*)

W. J. D. (Portsea).— (1) No alteration has taken place in the law relating to the sale of spirit of wine. It is still illegal to sell it, *excepting for medical use;* but this restriction is not rigidly enforced when the excise authorities see there is no attempt on the part of the chemist to evade the law by indiscriminate sale. See vol. iv. pp. 480, 493, and 577, and vol. vi. pp. 99, 101, and 145. (2) There can be no objection to the supply of spirit of wine, as in the case referred to, where it is mixed with other ingredients forming a solution for photographic purposes.

Juvenis (Wigan).—Hooper's 'Medical Dictionary' (Longmans), price 30*s*.

Intending Student (Havant).—'Selecta è Præscriptis,' Fownes's 'Manual of Chemistry,' Bentley's 'Manual of Botany.' Apply also for the 'Regulations, etc., of the Board of Examiners,' to the Secretary of the Pharmaceutical Society.

Tymn (Mexbro').—Fresenius's 'Qualitative and Quantitative Analysis.'

A. B. (Dover).—The article sold as "Glycerine Cream" is generally made by the addition of glycerine to "cold cream."

J. B. B.—*Tinctura Ferri Perchloridi*, when made according to the British Pharmacopœia, becomes opaque after standing a short time.

A Student.—Dr. Garrod's 'Essentials of Materia Medica and Therapeutics' (second edition).

A Correspondent (Liverpool) suggests that in the proposed Bill the clause which would prevent the Registration of a Chemist's Assistant until he was twenty-one years of age, should be replaced by one requiring him to prove that he had been occupied in the trade for a certain number of years, say five, six, or seven.

J. M. B.—The sale of the article referred to does not require a Licence.

The Liverpool Chemists' Association, The Leeds Chemists' Association, Mr. C. Jones, Mr. Miller, Mr. Mumbray, Mr. Willmott, Mr. Hadfield, Mr. Ekin are thanked for their communications. We regret that in consequence of the great press of matter we are obliged to defer the publication of several important papers until next month.

Erratum.—Omission, page 143, line 9 from the bottom, *after* Orridge *read* Sandford.

Instructions from Members and Associates respecting the transmission of the Journal before the 25th of the month, to Elias Bremridge, Secretary, 17, Bloomsbury Square, W.C.

Advertisements (not later than the 23rd) to Messrs. Churchill, New Burlington Street. Other communications to the Editors, 17, Bloomsbury Square.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VI.—No. VI.—DECEMBER 1st, 1864.

SEPARATE EXAMINATIONS FOR CHEMISTS ALREADY IN BUSINESS ON THEIR OWN ACCOUNT.

When, in August last, the resolution of the Council of the Pharmaceutical Society to hold separate examinations for chemists in business on their own account (who had been so for five years, or were not less than thirty years of age) came forth, we took occasion to consider fairly the question in all its bearings;—first, as to such chemists themselves; secondly, as to its effect on the character and standing of the Society; and lastly, as to our duty to the Legislature and the public, to which we were pledged by our acceptance of the Pharmacy Act of 1852. Fully alive to the temptation which might beset the Council when members were to be added to the Society, we yet ventured to believe that our tried men would not be found wanting; that they would feel the examinations were "*the very foundation of the Society, and the maintenance of their integrity the tenure by which its privileges are held.*"

Three months ago this could be but a matter of faith, and we now return to the subject because we have proof before us that our confidence was well founded. The assurance given was, that the subjects of examination should be the same as in the ordinary Major and Minor, but treated *practically* rather than *theoretically*. To make this distinction might be easy enough to an examiner with his candidate before him, but it did not seem so easy to reduce the difference to a written synopsis; that was a task requiring great care and time for consideration, and the examiners wisely declined to issue any hastily arranged instructions to those who wished to avail themselves of the new privilege. Such a synopsis is, however, now in existence, has been handed to every candidate, and put into the hands of the Local Secretaries for general diffusion throughout the country.

This, then, is the general outline of the proceedings:—

PRESCRIPTIONS.

1. Reading.
2. Translating literally.
3. Methods of Dispensing the Prescription.
4. Detection of Unusual Doses.

MATERIA MEDICA.

1. Recognition of Drugs.
2. Names of Plants or Animals yielding them.
3. Habitats and whence imported.
4. Preparations into which they enter.
5. Indications of the Commercial Characters and Qualities of Drugs.

PHARMACY.

1. Recognition of Preparations.
2. Description of their Composition and proportions of Active Ingredients.
3. Description of Pharmacopœia Processes.

CHEMISTRY.

1. Recognition of Chemical Substances used in Medicine.
2. Processes for their Preparation.
3. Chemical Composition and Decomposition.
4. Detection of such Impurities as are ordinarily met with.
5. Antidotes for Poisons.
6. Nature and Method of taking Specific Gravities.

BOTANY.

1. Recognition of Important Indigenous Medicinal Plants from Fresh or Dried Specimens.
2. Distinctive Characters of Roots, Stems, Leaves, Flowers, Fruits, Seeds, and their Parts.
3. Functions of Roots, Stems, and Leaves.

Now here lies the answer to our enemies who chuckled over the notion that we were, *in extremis*, offering a farce examination to all comers; the assurance to our friends, who trembled under the idea that we were sacrificing principle to expedience to gain popularity in times of commotion (an honest fear which we must respect in them); and a proof to the public that men holding our diploma are worthy to be trusted. And for the chemists who would take advantage of this means of obtaining Parliamentary recognition and registration,—what for them? Why, an assurance that the Society demands no greater qualification than every one of them ought to possess, and can give evidence of possessing, after two or three months' reading, in conjunction with the opportunities afforded by the daily exercise of their own business; and a much more self-ennobling appreciation of their diploma than they would have if it were granted to them on mere *certificate of fitness*, as was necessarily the case in the first formation of the Society.

An earnest of success may be found in the number who presented themselves for examination in October. Seventeen went up, and fourteen were successful in passing the ordeal. More than seventeen made application,—indeed, more than could well be examined in one day.

It is not intended to have examinations of this kind monthly, but the number seemed to demand the appointment of a second day, and in justice an early one was fixed. There will be no further repetition until the 25th January, and this we conceive will be an advantage to those who wish to present themselves; with the synopsis in hand they will know exactly what will be required of them, and knowing too that it will be honestly carried out, they will, we trust, be so prepared that not even three out of seventeen will be unsuccessful.

THE PROPOSED NEW PHARMACY BILL.

On Tuesday, the 22nd of November, as the newspapers have already announced, a deputation of the Council of the Pharmaceutical Society, consisting of Mr. Sandford (President), Mr. Hills (Vice-President), Mr. Daniel Bell Hanbury (Treasurer), Mr. Squire, Mr. Morson, Mr. Waugh, Mr. Orridge, Dr. Edwards, Mr. Flux (Solicitor), and Mr. Bremridge (Secretary), had an interview with the Right Hon. Sir George Grey, at the Home Office, on the subject of a proposed Bill for regulating the qualification of Chemists and

Druggists. The object of this interview was to explain to the Secretary of State the provisions of the Bill which has been prepared by the Council of the Pharmaceutical Society, and as far as possible to enlist the interests of the Government in its favour. It is necessary in such a case to show that the proposed measure will be likely to effect what is required for the public good. The "Bill for Regulating the Qualifications of Chemists and Druggists," assumes that it is expedient for the safety of the public that persons carrying on the business of a chemist and druggist by retail, in the keeping of open shop for the compounding of the prescriptions of duly qualified medical practitioners, should possess a competent practical knowledge of such business, and, before commencing such business, should be duly examined as to their skill and knowledge. There is no difficulty in establishing this position which forms the preamble of the Bill, but the Government and the Legislature have to consider not only whether the safety of the public calls for legislative interference in the particular direction indicated, but also how far the proposed interference would fulfil all that is required, and would do so in the most effective and unobjectionable manner. The basis of the Bill as it stands at present is as simple as it could be made. It imposes a test of qualification upon those who undertake to prepare the prescriptions of duly-qualified medical practitioners, but in other respects it leaves the sale of medicines unrestricted. Now it may be thought by some that this is hardly going far enough, as it leaves the sale of poisonous drugs in the hands of all who choose to undertake it. A stronger case in support of the Bill would no doubt be established if it was made to apply to the sale of all dangerously poisonous drugs, for this would touch the popular feeling on a point on which there is a feverish sensitiveness, and no small anxiety for the public safety. But the framers of the Bill wished to avoid making it a Poison Bill, being impressed with the difficulties attending the satisfactory settlement of the questions involved in that part of the subject. To some extent, however, the Bill as it stands will restrict the sale of poisons to qualified men; for if none but examined men be allowed to keep open shop for dispensing prescriptions, this will virtually exclude all others from the business, and although hucksters and grocers may sometimes undertake the sale of poisonous drugs, it will be easy by a separate measure to deal with any evils arising from that source when they have developed themselves. The great point at present is to bring all the Chemists and Druggists throughout the country into one united and legally recognized body, and to ensure their qualification for the most important of the duties they have to perform. This is the foundation upon which any efficient arrangement for the protection of the public in the sale and administration of medicines and dangerous drugs must be based. To the attainment of this object our efforts should now be directed. The Bill that has been prepared will accomplish what is required. No valid objections have been urged against it, and there is ground for encouragement in the opinions expressed with reference to it by those whose influence will aid greatly in getting it passed. But no means for promoting our object must be neglected, and in particular it is desirable that the Council should be furnished with as many expressions of opinion as possible in its favour from the body of Chemists and Druggists in every part of the country.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *November 2nd*, 1864,

Present—Messrs. Bird, Davenport, Deane, J. B. Edwards, Hanbury, Haselden, Hills, Mackay, Morson, Orridge, Proctor, Reynolds, Sandford, Savage, Watts, and Waugh,

The following were elected

MEMBERS.

John James ....East Dereham.
John Baily..London.
David Morgan ....London.
Thomas Mansell Orpe ....London.
Thomas Gilks Gibbons....................................Manchester.
Marshall Heanley..Peterborough.
Alfred Payne Balkwill.....................................Plymouth.
George Brown ....Saudown, I. W.

Specimens of dried indigenous medicinal plants were ordered to be procured and placed in the Library for the use of the students; also books containing original manuscript prescriptions.

BENEVOLENT FUND.

A third donation of Ten Pounds was granted to the family of a distressed Member of the Society, in the west of England.

The following subscriptions were announced:—

	£	s.	d.
Butcher, Thomas, Cheltenham...	£0	10	0
Davenport, John T., 33, Great Russell Street	2	2	0
Fay, Julius Cicero, Kingsland ...	1	1	0
Garle, John, Bromley	1	1	0
Harris, E. R., Brighton	1	1	0
Picnot, Charles, Strood............	1	1	0
Parkes, John C., Woolwich......	0	10	6
Prockter, Richard E., Cheltenham	0	5	0
Robertson, James, Edinburgh...	1	1	0
Russell, Charles J. L., Windsor	0	5	0
Southall, Son, and Dymond, Birmingham	1	1	0
Squire, Peter, 338, Oxford Street	1	1	0
Stott, Wm., Sowerby Bridge ...	0	5	0
Thomas, John A., Harrogate ...	0	5	0

EXAMINATION, *November 16th*, 1864.

MAJOR (Registered as Pharmaceutical Chemists).

Gilling, John...Lincoln.
Rickards, Edwin..Ludlow.

MINOR (Registered as Assistants).

Balch, Edwin ....Bideford.
Barrett, James ....Leicester.
Davies, John H. ....Newcastle-on-Tyne.
Shephard, Thomas F. ....Brighton.

REGISTERED APPRENTICES.

Name.	Residing with	Address.
Broomfield, Robert W.	Mr. Coupland	Harrogate.
Field, John	Mr. Shepheard.....................	Chester.
Lewis, William	Mr. Williams	Cardigan.
Lynn, Sam........................	Mr. Wellington	Oakham.
Parkes, William Edmund ...	Mr. Swain............................	Birmingham.
Pratt, Frederick William ...	Messrs. Hudson and Pershouse...	West Bromwich.

EXAMINATION, *November 23rd*, 1864.

(Registered as Pharmaceutical Chemists).

Goldfinch, George ....Hendon.
Harvey, Sidney ....Canterbury.
Lucas, Joseph ....Birmingham.
Mercer, Thomas William ....Rochdale.
Nosworthy, Robert ....London.
Rhind, William Waddell ....London.
Saville, John ....Howden.

PHARMACEUTICAL MEETING.

Wednesday, November 2nd, 1864.

MR. HILLS, VICE-PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting having been read, the following

DONATIONS TO THE LIBRARY AND MUSEUM

were announced, and the thanks of the meeting given to the respective donors thereof:—

The Chemical News.
The Chemist and Druggist.
The British Journal of Dental Science.
The Dental Review.
The Medical Circular.
The British Journal of Ophthalmology.
The Photographic Journal.
The Educational Times.
The Technologist.
The Veterinarian.
The Journal of the Society of Arts.
The Journal of the Chemical Society.
The Canada Lancet.
Bulletin de la Société Chimique de Paris. From the respective Editors.

Classified and Descriptive Catalogue of the Indian Department of the International Exhibition, 1862.

Classified List of Contributions from British India to the New Zealand Exhibition, 1865. By Dr. J. Forbes Watson. From the author.

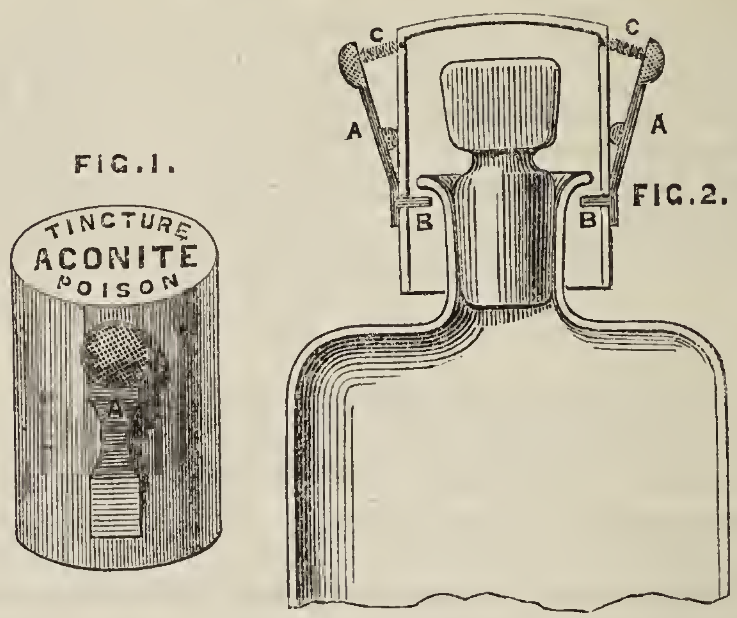
Specimens of Flowers used for Scenting Teas. From Messrs. Piesse and Lubin.

Fine Crystals of Bicarbonate of Potash. From Messrs. Huskisson and Sons.

The Safety Capsule Poison Bottle. From Mr. G. M. Howell.

The Chairman regretted that in consequence of the indisposition of the President he had been called upon to fill the chair. He was quite sure that the meeting would join him in thanks to their friends for the valuable contributions on the table. He wished to call their attention to one of these donations,—that of a "poison-bottle" which had been just placed in his hands, and which he thought might be found very useful for the purpose to which it was intended to be applied. Much had been said on the subject of accidental poisoning, and it was very important that they should take advantage of any means that might be proposed for the purpose of obviating these unfortunate occurrences,—and he thought the best thanks of the meeting were due to Mr.

Howell for introducing this bottle to their notice.* A committee had been formed for the purpose of investigating this subject, and he thought it very



desirable that they should resume their inquiry, so that the best precautions might be adopted for securing the safety of the public.

The following papers were then read :—

ON THE PRODUCTION OF HYDROCYANIC ACID FROM BITTER CASSAVA ROOT.

BY W. F. DANIELL, M.D., F.L.S., HON. MEM. PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

The presence of Hydrocyanic Acid in the roots of the bitter Cassava (*Manihot utilissima,* Pohl) was known so far back as 1836, from an analysis instituted by MM. Henry and Chalard, two French chemists, who arrived at the conclusion, that the active or poisonous principle of the product exclusively depended on this acid. At a subsequent date their researches were confirmed by Dr. Christison, from experiments on a supply of the preserved juice brought from one of our West India colonies. The specimen of this acid in a diluted form now on the table, with the connected preparations, was obtained from the fresh roots by Mr. Hughes, a young pharmaceutical student, a Creole resident in Kingston, Jamaica, by a process probably analogous to one of those detailed by chemical authorities. I may mention that Mr. Hughes is a representative of a type of young men, on the increase in many of our colonies, who are compelled to follow their preliminary studies under peculiar difficulties, owing, to a great extent, to their limited resources; hence in their early youth they are obliged to undergo a life of unremitting toil to enable them to procure the funds necessary to gain the diploma of the Pharmaceutical Society,—a diploma, I may observe, which is now held in high esteem in Jamaica and most portions of the globe.

The production of hydrocyanic acid in the tropics, where the raw material is abundantly provided, is evidently deserving of some attention; for, al-

* *Safety Poison Capsule.*—The purpose to which the design has reference, is to prevent mistakes in dispensing medicines, as the capsule cannot be removed from the bottle without pressing on the side levers, which liberate the two pins from the neck of the bottle.
References to the drawing:—A, Plan view; B, Elevation; C, Section.

though chemists have stated that the pure acid may be preserved unchanged if excluded from the light (which, doubtless, is true as applicable to colder climates), yet apparently such is not the case in the warmer portions of the tropics, for, even under the most favourable circumstances, it there gradually becomes decomposed into a carbonaceous black liquid devoid of taste and odour. A large quantity had recently to be condemned as useless in the military medical Depôt at Kingston, although strictly isolated in a cool underground store, and excluded from light and air.

The specific botanic differences that separate the bitter from the sweet cassava (*Manihot Aipi*, Pohl), are of such an indeterminate character, that botanists are inclined to class them merely as varieties of one species; the negroes, however, can readily distinguish them by certain peculiarities, and by no means can be brought to consider them as identical.

It has been asserted that the fresh juice of the bitter cassava is equally poisonous with that retained under atmospheric exposure for some time. I may, however, express some doubts with reference to the correctness of this statement, for I have noticed poultry, hogs, etc., in the vicinity of Stony-hill, eat the roots with impunity out of the red earth, and similar facts have been noticed at different periods by other observers. Their exemption from death has been ascribed (erroneously) to the adherent red earth swallowed with this food, the alkaline salts of which have been supposed to neutralize the activity of the poisonous principle. Long, in his 'History of Jamaica,' had even in the last century expressed views corroborative of this opinion, for he remarks that hogs feed on the fresh roots with avidity, and suffer no inconvenience, owing either to the use of the mould, or from some peculiar organic structures of the stomach and intestines that rendered this food capable of being assimilated into wholesome nutriment.

Under different conditions, however, the bitter cassava juice is far from being innocuous, and, by a very natural process, becomes converted into one of the most deadly substances. Whenever the cortical peelings of the roots with the water in which they have been washed and steeped, prior to the extraction of its starch, with the residual *débris*, have been allowed to remain exposed to the air for some period, and then thrown on the refuse heap adjoining the native huts, a gradual fermentation, or some abnormal change of its constituent elements occurs, and it is transformed into a virulent poison,—hogs, poultry, and every animal, in fact, paying the penalty of their lives should they be tempted to feed off this deleterious garbage.

This variety of cassava is cultivated in Jamaica chiefly for the large supply of starch it yields, deemed by the negro washerwomen to be of much better quality than that prepared from the roots of the sweet cassava. In the harvest season this starch is vended in the Kingston markets in considerable quantities, and, independently of various uses, is employed to adulterate the ordinary arrow-root of commerce, procured from the tubers of the *Maranta arundinacea*.

This product also constitutes an article of food among several of the negro tribes of western Africa, the roots having previously been roasted on the fire, to dissipate their noxious qualities. With some of the Susu populations to the northward of Sierra Leone, it is apparently more valued for the kind of spirit manufactured from the roasted roots. These are first moistened with water, exposed to the sun, and then reduced to a paste, from which the liquor is strained and permitted to ferment.

Professor Bentley, who (in the absence from illness of Dr. Daniell) read the paper, remarked that although the present communication made no claims to any fresh discovery, it confirmed the fact first noticed by MM. Henry and Chalard, and subsequently by Dr. Christison, of the presence of hydrocyanic acid, under certain conditions, in bitter cassava root. The specimen of the juice now on the table, and the products obtained from it, would be conclusive evidence, he thought, to all present, of the presence of hydrocyanic acid. It was certainly a most interesting circumstance that a root which yielded such a mild nutritious substance as tapioca, should also yield so virulent a poison as hydrocyanic acid. It was also remarkable that sweet cassava root, which was obtained from a plant so closely allied to that yielding bitter cassava root, would not under any circumstances produce hydrocyanic acid. The bitter cassava and sweet cassava roots presented in these respects a striking similarity to bitter and sweet almond seeds.

Dr. Edwards said that an analysis of the red earth alluded to in Dr. Daniell's paper, and which had been regarded as an antidote to the poisonous principle of the root, was desirable. It would probably be found to contain an antidote to hydrocyanic acid, in the form of oxide of iron.

Dr. Redwood thought that the author of the paper had left the question of the poisonous principle of bitter cassava root in a very unsatisfactory state. No information was given as to the quantity of hydrocyanic acid obtainable, nor any details as to the process adopted for the purpose. That hydrocyanic acid might be derived from bitter cassava root was clear, but how it was formed, was still a subject for investigation. Indeed, he thought that it had yet to be proved that hydrocyanic acid was the sole poisonous principle of the root.

ON SOME OF THE EXTRACTS OF THE BRITISH PHARMACOPŒIA PREPARED FROM THE DRY MATERIAL.

BY A. F. HASELDEN.

I.—*Extract of Calumbo.*

The British Pharmacopœia, which we were so anxiously looking for about this time last year, has now been in our possession nine months, and during that time it has been pretty freely commented upon by lecturers and others; but in those cases there has been no discussion between the lecturers and their audiences, or the writers and their readers; the talking, if one may so express it, has been all on one side of the table; now the opportunity for experimenting and obtaining something like reliable results in making the various pharmaceutical preparations, has probably been limited, influenced by the number of the changes and the disposition to ignore the work, but there has been time for many of us to try our hands upon the British Pharmacopœia dishes, and as there is abundance of material to work upon, I hope that my paper this evening will be but one of very many which will be contributed by the members and associates of the Pharmaceutical Society during the session. My present object is to bring before your notice some of the British Pharmacopœia extracts prepared from the dry material, touching upon those points in the preparation which seem to require it, and offering as far as it goes the result of my own experience, and thus make as it were a starting-point for free discussion, not in a spirit of criticism, but with the intention of coming at a fair and useful conclusion.

The extract of calumbo being a novelty in the British Pharmacopœia, I have selected it as the first upon which to say a few words, and in order that I may be as clear as possible, I must trespass upon you the form and process as laid down in the British Pharmacopœia. Take of calumbo, in powder, one pound, proof spirit, four pints; macerate the calumbo in two pints of the spirit for twenty-four hours; pack in a percolator, and pass the remainder of the spirit slowly through it, distil off the spirit, and evaporate the residue to a proper consistence. This extract has probably been taken from the Prussian Pharmacopœia, but unfortunately whilst borrowing the idea and the proportions, the compilers of our national Pharmacopœia have forgotten to copy the directions. Now the first and perhaps principal point to be noticed in the process given is this, that having macerated the calumbo in the first portion of the spirit, and having packed in the percolator, and poured on the remainder of the spirit, and having allowed as much of the spirituous liquor or tincture to pass through as will, there is no direction given for displacing that portion which remains absorbed by the marc, either by a weaker spirit or water, or by the simple operation of expression, as directed in the preparation of tinctures. This was probably an oversight, but nevertheless, what are the natural consequences which arise from following such directions? Just this: the calumbo is not more than half exhausted, about one-fifth of the proof spirit remains absorbed by it, and after distilling off from the tincture which has percolated through as much spirit as can be before evaporating the residue, there is a loss of something like eighteen ounces of rectified spirit out of the fifty used, and a product, after evaporating down, of one ounce and a half of extract, in appearance somewhat resembling leather, and at a cost of something like two shillings an ounce when made upon a small scale.

If we now continue our operations upon the marc by passing through it some hot water at a temperature of about 160° Fahrenheit, until it passes through without much bitterness,—for it is almost impossible entirely to exhaust it,—there will be obtained by evaporating the liquid another ounce and a half of a somewhat similar extract, but not so tough, making together, three ounces, from sixteen ounces of the root employed.

This simply proves that the Pharmacopœia process is a wasteful one, and does not obtain for the operator all that might be expected.

Now taking it for granted (and I am not quite satisfied about it) that spirit is necessary, and proof spirit the best menstruum for exhausting calumbo and making a good extract, let sufficient be used, and let all the tincture—for it is virtually a tincture—be displaced either by pressure or water, previous to the second part of the process, that of distilling off the spirit; nearly the whole of the spirit might then be recovered, and there can be no valid reason, that I know of, why water should not be used for displacing the tincture,—for granted that a little mixes up with the spirituous portion in passing through the percolator, it cannot in any way injure the product, as water is really, in any case, the menstruum which is evaporated down with the extract after the spirit has been distilled off.

The next point which I desire you to consider is this: is spirit essential in making good extract of calumbo? I believe it is not. It appears to me that there is nothing in the composition of calumbo which requires the use of spirit for the extraction of its bitter. According to Planche and Buchner, calumbo consists of from 10 to 13 parts of bitter matter, 6 parts of animal matter, 9 parts of gum, 33 of starch, and 39 of woody fibre, with a trace of volatile oil. The bitter matter is soluble in cold water, and that appears to be what is required. I have been in the habit of making extract of calumbo by percolation with cold water for some time, and long before the British Pharmacopœia was published; the product has averaged from two and a half to three ounces of extract from one pound of root. In the extract which I have here with the others, and recently prepared the product, was two and a half ounces from one pound, being one ounce more than obtained by the Pharmacopœia process and direction. To carry the question still further, I may say that a very creditable extract may be prepared by percolation with boiling water, the product being three and a quarter ounces from one pound of root, being three-quarters of an ounce increase upon the quantity obtained by the cold water process. In this last extract there is undoubtedly a considerable amount of starch; the relative proportion of the three preparations as to quantity stands thus:—

British Pharmacopœia extract	$1\frac{1}{2}$ oz.	from 1 pound of root.
Cold Water	$2\frac{1}{2}$ oz.	,,
Boiling Water	$3\frac{1}{4}$ oz.	,,

I am not quite sure that percolation has any advantage over maceration in the matter of calumbo, for every one who has practised upon it must have experienced the fact that calumbo is not the most tractable substance one could have in the percolator.

It may also be a question for consideration whether the absence of the starch in the extract and the infusion is an advantage or not,—whether the propensity in the present day to leave out everything which has the character of being inert matter is always an improvement; and I am sometimes doubtful whether in some pharmaceutical preparations, the scientific fever is not carried too far.

When we call to mind that calumbo is often given in an irritable and weak condition of stomach, and after attacks of diarrhœa, when more active tonics might not be advisable, the question will occur, is not that starch, which some are so desirous of leaving out, the very thing that might be useful? Arrow-root and other starches are naturally suggested as articles of diet for persons so suffering; permit me to quote in addition a few words from one of our lost friends, but no mean authority. The late Dr. Pereira says:— "Calumbo is one of our most useful stomachics and tonics. Its great value consists in its not being apt, like other and more powerful tonics, to create nausea, sickness, febrile disorder or headache, so that it is tolerated when other remedies of this class would be immediately rejected. Indeed, on many occasions it evinces a positive power of checking vomiting. Probably it owes these valuable properties to a combination of circumstances; such as its freedom from acidity and astringency, the large quantity of starch which it contains (from which it acquires its demulcent properties), and the peculiar operation of its bitter principle." But one word more, and that for ourselves: every dispenser knows that extracts when made into pills require something to give them consistence and render them permanent in shape,—the starch would do this in extract of calumbo.

II. *Extractum Glycyrrhizæ.*

The next extract upon which I beg to offer some remarks is that of Liquorice, and I am induced to select it because the process of the British Pharmacopœia is just the reverse of that of the London Pharmacopœia, which has hitherto been our guide.

In order to be plain and clearly understood by any who may not be conversant with the process and directions of the British Pharmacopœia, I will just read the form.

"Take of liquorice-root, in coarse powder, 1 pound, distilled water a sufficiency, macerate the liquorice-root in 8 fluid ounces of the water, for twelve hours; then pack in the percolator and add more distilled water until the root is exhausted. Heat the liquor to 212° and strain through flannel, then evaporate by a water-bath to a proper consistence."

Now, the process of the London Pharmacopœia has maceration of the fresh root in boiling-water for twenty-four hours, decoction of the liquid to one-half, straining whilst hot, and evaporating to a proper consistence.

You will at once perceive that in the British form there are four points in which it differs essentially from the London, namely, the extract is to be prepared from the dried root, cold water is to be used in the place of boiling, and percolation instead of maceration, and lastly, the liquor is to be heated to 212° Fahrenheit, in order to separate any albuminous matter, which is to be taken out of the liquor, by means of straining through a flannel bag, before evaporating it down to the consistence of an extract.

Percolation with cold water was the process directed in the last Edinburgh Pharmacopœia, and maceration with cold water in that of the Dublin; but the Dublin did not order the liquor to be heated before being strained and evaporated. There are one or two points in the preparation of this extract to which I may draw your attention; in the first place, the root is to be dried and coarsely powdered: this part of the operation increases the amount of labour, for, in order to dry the root by a gentle heat, it should be first sliced. Now, during the drying, the root will, upon an average, lose one-half its weight, so that two pounds of fresh root will part with one pound of moisture; I say this is the average, because the root will sometimes vary according to the dampness or dryness of the season or the time when it is dug up, and also, according to the time which may have elapsed between the taking up and the drying by artificial heat. It would be natural to suppose that the root having parted with one-half its moisture, that would be precisely the quantity required to macerate the powdered root before placing it in the percolator, and so bring it to its normal state as to moisture, and just in the condition to yield up everything soluble in water; but it may be observed that the Pharmacopœia directs otherwise, and it is correct in so doing.

The direction says, macerate one pound of coarsely powdered root with eight fluid ounces of distilled water,—just one-half; this, it is true, can scarcely be called maceration, for the quantity of water is not sufficient to moisten the powder, but nevertheless it is enough for the purpose, and if more is used, the mass puts on a pasty, pudding-like character, settles down and packs itself so firmly in the percolator, that the liquid passes through so slowly, that before the root can be exhausted, if circumstances as to temperature (a warm shop heated by gas) should assist, it is highly probable that fermentation will take place in the marc, and alter the character of the product both in quality and quantity. This little caution as to the amount of water used in the moistening or macerating of the root, is, I believe, important and worthy of attention, and more especially if extract of liquorice is likely to be made upon a large scale by the cold-water percolation process. In small quantities, attending strictly to the directions of the Pharmacopœia, using in all about eight pints of distilled water for exhausting one pound of dried root, a clear good extract will be obtained, soluble in water and proof spirit, throwing down a slight deposit from the latter solution upon standing; thirty per cent. of moist extract will be the average product from dry root, which is equivalent to fifteen per cent. from the fresh root, seeing that the fresh loses one-half its weight in drying. It is, I think, with commercial men at all times an object to know the cost of producing an article: well, this extract costs, upon a nice calculation, about 4*s.* 6*d.* a pound, and, in making this calculation, I set the fire used in drying and the labour of powdering or grinding against the fire in making the decoction and the labour of bruising. Now the average cost of English extract of liquorice, as supplied by wholesale druggists, is 3*s.* per pound, so the Pharmacopœia article costs 1*s.* 6*d.* per pound more than the commercial,—truly exemplifying the fact that the compilers of the British Pharmacopœia spared no cost in order to obtain a good preparation; and indeed, if there is one thing more than another in which price should not be complained of, either by the vendor or consumer, it is in the production of good medicines.

As there are two sides to most pictures, let me now say a few words upon the process of making the extract by decoction. The form as directed in the London Pharmacopœia was not altogether a good one, and therefore, as I have been in the habit of making some quantities of this extract, I will lay before you my own *modus operandi.* In the first place, I prefer the large full-grown roots, or, more properly speaking, underground stems, as they generally yield a far larger and better product. They are bruised with a mallet, so as to lay well open the entire skin, and then cut into convenient lengths of ten or twelve inches; then placed in a copper, and in the evening covered with water to the extent of three or four pints to the pound; allowed to macerate until the following morning, when a fire is put under, and the contents, after being brought to the boiling-point, suffered to simmer for two hours; then left to infuse until the following morning, when the liquor, still warm, is run off and strained as it comes out of the tap through a canvas bag; then transferred to a pan heated by steam, and evaporated to about one-third, when it is taken out and placed in an earthen pan, and there allowed to deposit, and when cold the clear liquor is poured off, and the thick strained through flannel; this process is repeated with two quantities more water, only in these the water used is much reduced in amount. The first liquor, rich in extract, is evaporated down by itself, and the poorer liquid from the second and third decoction by itself, mixing the products towards the end; by so doing, the first rich liquor is not subjected to the action of heat more than half the time it would be if, as directed in most pharmacopœias and books, the *mixed* liquors were evaporated down together; and this remark is applicable to nearly all the extracts prepared from the dry material, whether by percolation, cold maceration, infusion, or decoction, and I think it well worthy of attention, for, by keeping the first portion apart from the rest, should any peculiar aroma be present, the advantage of the plan will be at once apparent. In addition, I may add that the long-continued heat renders the extract less soluble when finished than it otherwise would be.

Now, by this manner of proceeding, fresh liquorice-root yields upon an average something less than one-fourth, approaching very closely twenty-two per cent. of good, sweet, rich extract, answering well as a demulcent and sweetener of other preparations not so agreeable as itself. It is soluble in cold water and proof spirit, leaving, like that prepared by percolation with cold water, a deposit on standing from the spirituous solution. The cost of this extract may be stated, at the outside, at three shillings per pound. Now, a much larger product may be obtained by straining the decoctions whilst hot, as according to the Pharm. Lond., and evaporating them at once, amounting to thirty-five per cent. of the fresh root; but this extract contains a considerable amount of mucilage, amylaceous and gelatinous material; but nevertheless it is very sweet, and well calculated for liquorice jujubes, etc. This extract, as might be anticipated, is not perfectly soluble in cold water, but yields a deposit giving unmistakable evidence of the presence of starch. These extracts, as a rule, become darker by age, as may be seen by that prepared in 1862, which is on the table with the others. The product and cost of the three preparations stand thus:—Percolation with cold water fifteen per cent., at a cost of 4*s.* 6*d.* per pound; decoction and strained when cold twenty-two per cent., at a cost of 3*s*. per pound; decoction and strained hot thirty-five per cent., at a cost of 2*s*. per pound.

I have now, I believe, in one sense pretty well exhausted this subject, though there may be points which I have passed over; but I trust that, while I have endeavoured to show that the Pharmacopœia process is a good one, and that the process of decoction is also good if well carried out, I have thrown out some hints which may not be altogether without their value.

October 31*st*, 1864.

In the discussion which took place after the reading of this paper, allusion was made by Mr. Mackay, of Edinburgh, to some extracts that were exhibited at the International Exhibition of 1862, by M. Berjot, of Caen, in the French department. Mr. Mackay wished to know if any of the members present could give any information as to the mode of producing those extracts. Specimens of them were deposited in the Economic Museum in Edinburgh, and they had attracted a good deal of attention there, and were thought, in some respects, to be very superior to the extracts commonly met with.

Professor REDWOOD said the extracts alluded to had not escaped the attention of the jury appointed to that department of the Exhibition. They were carefully examined in common with other pharmaceutical products, but they were not considered deserving of any very special commendation, on account of their very unstable nature. They were made by evaporation *in vacuo*, and being reduced to perfect dryness while in the vacuum pan, they had a light spongy condition, somewhat similar to that of tannin, as usually prepared. They could only be preserved in this state, however, while they were perfectly excluded from air containing any moisture. The vesicular condition they were in while dry gave them a light colour very different from that which they acquired on exposure to the air, when they speedily became soft.

Mr. D. HANBURY had examined the extracts alluded to, in the Exhibition, but he in common with others did not consider them worthy of imitation. It would be impossible to keep them for use in dispensing without their becoming completely changed from even very slight exposure to the air.

Several opinions were offered with reference to the extracts prepared as described in Mr. Haselden's paper. The extract of calumbo made according to the Pharmacopœia was thought to be inconveniently tough and leathery. That made with water had a better consistence. Of the extracts of liquorice, the prevailing opinion seemed to be that that made by the Pharmacopœia process was the best.

Mr. UMNEY stated, as the result of his experience in making extract of liquorice on the large scale, that it was necessary to adopt a somewhat different method of operating from that described in the Pharmacopœia. The plan he adopted was to macerate the coarsely powdered root with water in a large barrel for twenty-four hours, then to drain off the liquor and press the marc, finishing the extract as described in the Pharmacopœia. If the root was left in contact with water for more than twenty-four hours, fermentation was very likely to set up. With reference to extract of calumbo, he had obtained a larger product than Mr. Haselden mentioned by the spirit process, but he had used sufficient spirit to exhaust the root.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

The Annual Meeting was held at the Royal Institution, Colquitt Street, on Thursday evening, September 29th, 1864; the President, John Shaw, Esq., in the Chair.

The President, having explained the business before the meeting, called upon the Hon. Secretary, H. Sugden Evans, Esq., F.C.S., etc., to read the following Annual Report of the Council:—

Annual Report:—In bringing to a close the fifteenth session, your Council present, with much pleasure, their Annual Report of the continued prosperity of the Chemists' Association.

During the session the addition of thirty names has been made to the roll of members; but from death, removal to other places, and other causes, some names have been removed, leaving an increase of twenty-two.

The continued interest in the subjects discussed at the ordinary fortnightly meetings has been manifested by the excellent attendance of members, which has been above the average throughout the session. The papers read and lectures delivered have, in comparison to former proceedings, maintained their high character; and the publication of the long looked-for British Pharmacopœia, during the session, gave a new interest to the meetings. One extraordinary and two ordinary meetings, to which the members of the medical profession were invited, were devoted to the discussion and critical examination of the additional new, and altered old, formulæ, resulting in the conclusion that many valuable improvements have been introduced, at the same time that many emendations were requisite to the perfection of any future edition. Three ordinary meetings were also devoted to the more careful discussion in detail of special subjects involved in the British Pharmacopœia.

In view of a probable new edition being shortly called for, your Council would urge upon members the desirability of carefully noting, in the practice of their manipulations, the character and results of the preparation which may come under their observation, so as to enable them to suggest improvements, the discussions of which, at our ordinary meetings, would afford much interest and practical information.

In compliance with the very generally expressed wish, your Council held, during the session, a conversazione, which was well attended; and they have pleasure in referring to this addition to the many delightful meetings of a similar character which have from time to time taken place.

Encouraged by the success of the excursion to Runcorn Gap, held last year, your Council were induced to make arrangements for a similar excursion this summer to St. Helen's, which took place on the 18th of August, when a large number of members and their friends visited the chemical works of A. G. Kurtz, Esq., the iron foundry of Robert Daglish, jun., Esq., and the glass works of Messrs. W. and R. Pilkington; thereafter dining together at Thatto Heath. Your Council desire here to record their acknowledgment of the kind and courteous attention the members received on the occasion from the above proprietors.

In response to an invitation from the Executive of the British Pharmaceutical Conference, your Council were glad to avail themselves of the opportunity to depute Messrs. J. Abraham, J. B. Edwards, Ph.D., and N. Mercer, to attend the meeting at Bath, and present the following resolution:—"That the Delegates be requested to convey to the Conference the hearty approval of the Council of the Liverpool Chemists' Association of the important objects contemplated by the Conference, as set forth in the constitution and rules, feeling assured that the labours of its members will be productive of large and valuable results to Chemical and Pharmaceutical science; also that when a favourable opportunity occurs, the Liverpool Chemists' Association will be glad to welcome the Conference to Liverpool."

The deputation reports that the meeting, which lasted four days, was of a highly satisfactory and encouraging character, the communications were of a practical and valuable nature, the attendance uniformly good, the discussions interesting, and the general feeling one of great unanimity and concord. The invitation from the Association for the Conference to hold a meeting in Liverpool was cordially received, and will be accepted on the first opportunity.

The Library and Museum continue to receive valuable additions, and to afford important aid to members and associates in their varied studies and investigations.

Your Librarian, Mr. Scoffin, reports that during the past year 572 volumes have circulated amongst 60 readers.

Your Council regret that they have to record Mr. Scoffin's resignation of the post of Librarian through the pressure of his other business engagements, and that in consequence a further removal of the Library will be necessary. In selecting a new locality, your Council will consult the convenience of the members, and hope to be able to make arrangements for placing it in this Institution, which arrangement they believe would prove highly satisfactory to the members and associates.

Your Treasurer, Mr. Sumner, will read to you his Financial Statement, showing a balance of £35. 6*s.* 1*d.* to the credit of the Society, the appropriation of which will devolve upon the new Council.

Mr. R. Sumner having read the Financial Statement, the President moved the adoption of the Reports of the Council and Treasurer. In reference to the resignation of Mr. Scoffin, the Librarian, he observed that that resignation would render the removal of the Library necessary, but he hoped they would be able to make such an arrangement as would enable them to have the Library in the Royal Institution.

The motion was seconded by Mr. H. Bird and adopted.

Mr. H. Bird moved "That the Council Report and Financial Statement now read, with the Proceedings of the Association during the past Session, the Laws and Bye-Laws, the Catalogue of the Books in the Library, and the List of the Members and Associates, be printed and published."

Mr. R. Sumner seconded the motion, which was carried.

Mr. A. Redford moved "That the best thanks of the Association be given to those gentlemen who have lectured or read papers at the meetings, and to the donors to the Library and Museum during the past session."

Mr. King seconded the motion, which was carried.

Mr. W. King moved "That the thanks of the Association be given to the officers and other members of the Council, and especially to Mr. H. Sugden Evans, F.C.S., for their valuable services during the year."

Mr. A. Redford seconded the motion, which was carried. The President acknowledged the compliment.

The meeting then proceeded to the election of four members to fill up the vacancies in the Council caused by the retirement in rotation of Messrs. H. Sugden Evans, J. Dutton, N. Mercer, and M. Murphy. These gentlemen were re-elected.

Mr. R. Sumner expressed a wish that the list of associates should, if possible, be increased, and remarked that it did not increase so much as that of the members. He thought the Library would be more advantageous to the Association at the Royal Institution than elsewhere.

The Secretary announced the following donations to the Library:—'The Chemist and Druggist,' from the Editors; 'The Proceedings of the Historic Society of Lancashire and Cheshire,' from the Society.

After a vote of thanks to the Chairman for his services had been accorded by acclamation, the proceedings terminated.

The first General Meeting of the Liverpool Chemists' Association was held at the Royal Institution, Colquitt Street, on the evening of the 13th of October. The President occupied the Chair, and there was a large attendance of the members.

The Hon. Secretary having read the minutes of the last Annual Meeting, recording the re-election to the Council of Messrs. H. S. Evans, J. Dutton, N. Mercer, and M. Murphy, he announced that the Council had made the following selection from its body to fill the respective offices attached, namely:—Mr. A. Redford, President; N. Mercer, Vice-President; R. Sumner, Treasurer; M. Murphy, Hon. Secretary. Also that Dr. Edwards and Mr. N. Mercer, F.C.S., had been appointed to conduct the Laboratory Pharmacy Class for the ensuing session, conjointly; and that Messrs. J. Abraham, S. Banner, J. B. Edwards, H. S. Evans, and M. Murphy had been constituted the Library and Museum Committee.

The following gentlemen were elected members:—Messrs. Henry Murray Steele, R. Pheysey, and J. F. Brown.

The donations to the Library announced were:—'The Analysis of the British Pharmacopœia,' by Dr. Nevins, from the Author; 'The British and London Pharmacopœias Compared,' by George Barber, Esq.; 'The Chemist and Druggist' for September, from the Proprietor; 'The Technologist,' from the Editor.

Mr. J. Shaw presented, through the kindness of Major Greig, a number of Calabar beans, the seeds of the *Physostigma venenosum*, to the Museum.

The President proposed that the thanks of the meeting be given to the donors; it was carried.

The President then proceeded to deliver his annual address. He said,—Gentlemen, Another year, with its thousandfold transactions, its startling facts, and ceaseless flow of word and thought, has passed into history, and finds us, the members of the Liverpool Chemists' Association, upon the threshold of a new arena of discussion, research, and education. It is with very mingled feelings that I meet you this evening, to inaugurate the sixteenth session of this Society's proceedings. The position in which your Council have placed me, as President, is one the duties of which I cannot for a moment consider without the greatest solicitude. Indeed, I fear that in accepting this highly honourable but responsible office, which I have done, after a very great deal of hesitation, I have laid myself open to a charge of presumption, that one in such indifferent health, with such a scanty acquaintance with science, and so much pre-engaged, should stand in the way of others far more able and worthy to preside in this assembly, and far more worthy to wear the mantle that descends from those highly esteemed gentlemen who have graced this chair before me. I can only say that while I thank you for the honour you have, through your Council, done me, it shall be my study to make my poor abilities keep pace with my earnest will for the continued success and growing efficiency of the Liverpool Chemists' Association. In looking forward to the duties of the coming session, as I do through the clouds I have just indicated, as well as through the cares of a public appointment, the details of which would almost puzzle an Admirable Crichton, it is a great consolation to know that your Council have elected as Vice-President a gentleman whose fame and esteem among us to attempt to augment by any eulogium of mine, would be an impertinence. The very history and existence of the Society is wound in thread for thread with his own. That gentleman is our esteemed friend Mr. Nathan Mercer. As Secretary, his energy and zeal have never been surpassed. What, then, will his Vice-Presidency be? I fear to think of a future, when his counsel and far-reaching judgment shall not be available for your interests.

I must also congratulate you upon the accession to office of another gentleman, who gives promise as Secretary of being a worthy successor to the Mercers, and Walkers, and Shaws, and Tates, and Evanses of the past.

Mr. Murphy, I have very little doubt, will leave the impress of his well-known abilities upon this Society, as I hope, we are collectively, as an association, leaving our mark upon the Pharmaceutical trade of this country and the age. Long as I have been connected with your Association, which is nearly from its commencement, I have never felt more interest in its operations and success, than at present, nor so much impressed with its value and usefulness. I wish for it the most decided progress and enlarged prosperity, because this is almost sure to be the result of increasing education, thoughtfulness, and elevation among the members of our community in Liverpool.

Among the pleasures and advantages connected with an association like ours, both to employers and employed, I may mention the pleasant social intercourse which it secures, when we sip together the cup of friendship, "which cheers but not inebriates," the happy oblivion of unpleasant distinctions, the confidential interchange of opinion, by the humblest with the most distinguished; and last, though not least, let me not forget "the bright spots in memory's wastes," when at our conversaziones, the cheering, elevating influence of the gentler sex is shed upon our path. In our keen pursuit of science and improvement in our art, let us not forget the cultivation of the moral feelings. And as often as we can, let us try and share our pleasures with those who too often have to share our pains and cares. I do not over-estimate the influence of our Association when I say that it must tend to the production of good feeling, and mutual respect and confidence among all its members. The members of an intellectual and scientific professional brotherhood meet here on equal ground. We have a freemasonry of thought ranging over the wonder-teeming worlds of chemistry, botany, materia medica, and therapeutics; our passwords are the discoveries we make, the information we gather: one truth elicited, one fact wrung from the vast unknown around us, is worth a thousand petty advantages and trade jealousies. I trust the day has dawned, and advanced by many hours, when we can say that the improvement and advantage of all is the advantage of each. As workers side by side in the mine of knowledge and human progress, let us not look askance at one another, but freely afford that cordial help which medical men so generally understand, and which is but the currency of a common humanity.

Before I leave these topics, and because the man precedes the chemist, bear with me while I touch, and it shall be tenderly, on one or two related subjects.

The high position which our profession takes in the social scale, by reason of the intellect and attainments necessary for its successful pursuit, commits us to a correspondingly high, conscientious course; the more conscientiously we exercise our vocation, the greater our self-respect will be, and the esteem of our fellow-men.

As was observed by Mr. Harvey at Leeds, in regard to opium-eating, which, according to Prof. Taylor's report, casts some of its odium upon the chemists, "We may sometimes have the opportunity of discouraging the improper use of opiates. The chemist can warn an incautious customer of his danger. In other cases he would, I conceive, be fully warranted in refusing to sell opiates when it is plain they are used habitually and improperly. Among the poor the use of opiate anodynes for their teething children may often be quietly but effectually discouraged, and the customer be persuaded to try much better and safer means."

This is but a sample of the power for human good in our hands. But there are other vices as common as the use of opium. To say that quackery and puffing are peculiar to chemists, would be very wide of the truth; indeed, it would be difficult to find a department of human activity where these pernicious parasites do not fasten their mandibles, and weaken, if not altogether destroy, the finer moral feelings. But have not the sick, afflicted, ignorant, and poor in all ages been a prey to the unscrupulous, from their credulity in matters connected with the mysteries in the healing art? He that gives another ground for false hope, and raises expectations he cannot fulfil, is a disgrace to any profession.

Let me in this connection urge upon my elder brethren in the trade the kindly consideration of the claims of the young, who are training up in our establishments, and who will take our places in the next generation. Let us, as much as possible, curtail the hours of labour, and cheerfully accord them opportunities of study. And again, without apology, let me express my firm conviction of the inviolability of the Sabbath, and the lasting obligation of the command, "Remember the Sabbath Day, to keep it holy." How this is to be done I leave to those individual convictions which it has been the object of these remarks to foster, nor would I for a moment bind a yoke upon any.

To those who are entering the profession of pharmacy, I may be allowed to repeat the oft-heard warning, "Yours is the seed-time of life;" sow sparingly, and such will be your harvest. Study at intervals, few and far between, and let your applications to the dusty Pharmacopœia, and dustier laboratory, be like "angels visits," and it will be as easy to predicate your future as to work a rule-of-three sum. Of all things avoid indolence, and cultivate habits of study, and you will soon surprise yourselves with the ease and facility with which that labour is performed which has become habitual and pleasant.

The foundation of character of any worth is well said to be in "a thoughtful mind, good principles, and a strong will." Secure these at all hazards, and they must lead to proficiency in any branch of your studies and pursuits. Apprentices and assistants have their discouragements; the former too often look upon the all-pervading ubiquitous dust as the arch-enemy that devours their time and peace alike, forgetful that though disguised, he is a friend who schools them in lessons of industry, neatness, and perseverance, the value of which future life alone can reveal. The latter, we admit, are among the most over-worked and ill-paid members of the community. As Mr. Long said last week of the medical profession, "ours is a noble art, but a poor trade," but the present time is not without omens of better times ahead.

The bad consequences of a false start are instructively shown in the early history of Berzelius, the eminent Swedish chemist, who may perhaps be called the father of modern chemistry; while at the same time his success, in spite of immense opposition, affords the highest encouragement to the young resolutely to go forward with dauntless will till every obstacle is overcome. Early an orphan, it is related that "he was for some years under the care of a pious Swedish clergyman, with whom he read a chapter of the Bible every morning, and one of 'Sturm's Reflections' every afternoon, preparatory to his daily walk. In the course of one of these walks it is related, that, struck with his eagerness in collecting plants, and with the acuteness of his observations, his step-father remarked, 'Jacob, thou hast talent enough to walk in the footsteps either of Linnæus or Cartouche,—I hope thou hast God before thy eyes, and so wilt thou do the former.' Yet for some time he gave little prospect of the fulfilment of these hopes. Bandied about from house to house, and brought up among connections who looked upon him as a burden, his vigour, though unbroken, was long subdued. When his childhood was over, he spent four unprofitable years at the school of Nordköping, and quitted it along with some other young men for the University of Upsala; but opposite to his name in the list forwarded by the Rector of the school to the University authorities, were the words 'Indifferent in behaviour, and of doubtful hope.' He was received, therefore, with reserve, and regarded with suspicion; his first year was passed idly, and consequently, in his 'Examen,' the professor of chemistry was so dissatisfied with his answers as to say to his brother professors that 'he would not send the young man back if they were satisfied with him.' He was thus partially disgraced, and, it is probable, roused thereby to exertion. He was nineteen years of age when he began to frequent the laboratory of the professor, then, as now, in the Continental universities, open to the students. But his evil name accompanied him thither; on one of his first visits he was encountered by the question, 'If he understood the difference between a laboratory and a kitchen?' and finally the treatment of the laborator drove him from it in disgust. Meanwhile he studied assiduously at his lodgings, without counsel or advice, and the despised pupil succeeded, in his own apartments, in preparing oxygen gas, and showing the combustion of various substances in it, to his fellow-students, although in the laboratory for a whole year the attempt had been made in vain." The sudden and unexpected acquisition of a glass retort by surreptitious means, with which he experimented at home, in the silence and solitude of night, led to his first chemical discovery. The searching spirit which years before had struck his step-father in the child, had begun again to animate the young man; and though years of difficulty and struggle afterwards beset the man, this keen spirit never once forsook him. Professors opposed him in his examinations, and academies returned his papers with cold scorn. As the reviewer sums up, "the early life of Berzelius was thus a constant struggle with poverty, with unkindness, and with many difficulties, which had originated in an idle, listless, and unconciliatory disposition, itself the fruit of a depressed and half-broken spirit. How different the opinion formed of him by his teachers from that which his pupils and friends universally entertained in after-life. The mental discipline he underwent at college, probably, however, improved him as a man; and had he not thus been almost forced into the study of experimental science, to which his mind seemed early and naturally predisposed, he might have passed a life of little comfort to himself, and of no value to his country."

Need I remind you of the great advantages offered for the acquisition of knowledge by our excellent Library and Museum, in addition to the papers read at our fortnightly meetings, and also of the Chemical and Pharmaceutical Class, now placed under the joint superintendence of Dr. Edwards and Mr. Nathan Mercer? The latter, I trust, will be well attended through the coming session. The whole of these form such a combined assemblage of privileges as few provincial towns can boast. The remembrance of the good old cathedral city in the midland counties, where I served my apprenticeship, now nearly twenty-five years ago, often comes across my mind in strange contrast to what I see now, and I think what would I have given to share in the stirring questionings and stimulating fellowship of inquirers which your Association presents.

But I must not forget that an inaugural address, without a retrospect and a prophecy, would be very much like acting 'Hamlet,' with the Prince of Denmark left out. I shall carry you with me, most likely, when I say that the past or rather passing year has been or is the most eventful to our community we have seen since the formation of the Pharmaceutical Society. The great event of the year to us is the appearance of the long delayed British Pharmacopœia. Let us rejoice that the learned medical professors of the United Kingdom have at last agreed to bury their national pharmaceutical predilections beneath, or to enshrine them within, that monument of advancing intelligence. The British Pharmacopœia is a boon that we cannot feel too thankful for; with all its faults, it is a great achievement, and if not perfect, as few can wonder at, who know the history of its incubation and birth, it is a first step that cannot fail to be followed by other and more perfect ones. It contains many additions to the Materia Medica, which had become widely used and deservedly esteemed. It supplies us with elegant and effiient preparations, not previously recognized, such as the Syr. Ferri Phosphatis, Syr. Auantii Floris, and so on; with Lin. Aconiti and Belladonnæ, Lithiæ Citras, etc.; the liquid extracts of opium, male fern, pereira, and bael; the permanganate of potash, officinal lozenges, juices, cataplasms, and suppositories; new ointments, as veratria, calomel, cocculus, aconitia, atropia, and turpentine, with new and improved formulæ for other preparations such as Syr. Sennæ, Syr. Limonis, Infusum Gentianæ, etc.; and a new process for the perparation of tinctures, combining the advantages of both maceration and percolation; and the new feature of making up products to a definite quantity, and giving a standard of the result, which ought to be obtained from every process—I will not attempt to advance, however, on this well-trodden road, but above all it fixes the ground beneath our feet. We are not now ever treading on the shifting sands of three varying Pharmacopœias, never quite certain that we were right where they conflicted; but now we have an appeal to one sure and universal standard. You are well acquainted with the principal objections to the work, such as its omissions, its errors, its posological silence, its arbitrary alterations, and singular nomenclature. You have heard stated fully the practical inconvenience and uselessness of some omissions, the strangeness of its errors, and the disagreeable costliness of keeping duplicate medicines with varying flavours; the impossibility of fractionizing the new ounce with accuracy, and the impossibility of dismissing to limbo those useful handmaids to prescribing and dispensing, the scruple and the drachm, time-honoured institutions of the art, which no living man among us, I fear, will see laid to rest; so that I need do no more than just indicate such things. I think it somewhat strange, after the interest the profession took in its discussion at first, that the nomenclature and preparations have not come into more general use. But time, which always works wonders, will be the best friend of the British Pharmacopœia.

The late Pharmaceutical Conference at Bath is another event which has transpired of very great importance to us as a body. I cannot help referring you to the admirable opening address of Mr. Deane, the President; it is a model, which will well repay careful perusal. The papers read, and the discussions raised, were most interesting and important, judging from the report in the 'Pharmaceutical Journal' for this month, and I have no doubt that the publication of those papers will be a great boon to the trade generally. The effect of these gatherings is likely to be beneficial in advancing pharmacy, and it is to be hoped will not interfere with the support of local institutions having similar objects. I, for one, should regret to see this, while I think the Conference might be regarded as a sort of Upper House of Peers, to be looked forward to with pleasure by those who desire or deserve elevation. The Editor of the 'Pharmaceutical' says, "It is by inducing our brethren in different parts of the country to look beyond the mere drudgery of trade, to accustom themselves to the investigation of phenomena which are frequently coming under their observation, to confer together on the results of these investigations, and thus to cultivate a love for science and mutual friendship one with another, that these provincial meetings may be made most useful."

The subject of the prevention of accidental poisoning was brought forward at the third day's sitting of the Conference. The Committee having that subject under its care, brought up their report, which will be found printed in the Journal. A discussion ensued, and upon the fourth day the whole culminated in a list of suggestions, amounting to seven in number, which were received by resolution, with thanks. But before going further I must adopt the language of Mr. Deane, "that the subject is one, the importance of which to us, as responsible persons, in the sale and dispensing of medicines, it is scarcely possible to over-estimate. It is one so large, complicated, and difficult, that I am quite incompetent to lay it before you in that clear and logical manner it requires to impress you fully with its importance." I must say that it is one requiring so much time, and careful thinking over, that I have been quite unable to do any justice to it. It will perhaps not be forgotten that in October, 1861, I read a paper in this room on the subject, when I laid before you samples of all the poison-bottles then in existence. My advocacy of Savory's bottles at that time, though earnest, was not received with so much favour as I think it would have been now, with the result of three years' experience, in mind. I have continued to use the hexagonal, coloured, fluted bottles ever since, and the fact that their use is spreading, and becoming general, and that the York Glass Company are now making a similar bottle, I take as conclusive evidence of the general approval. One great point is gained if all would combine to use the angular and coloured fluted bottles for outward applications of a dangerous character, so that the public might be educated to the idea which we express by that shape. As the result of my own experience, which extends over three years, during which I have used some grosses of the bottles, I have only had one bottle brought back appropriated to another purpose—hair oil—than the original; but were they misappropriated every day, I should always feel it my duty to exchange them for ordinary ones. Another poison-bottle has been invented by Mr. Merrikin, which he calls his caution-bottle, and is getting the patent completed. I regret being unable to show this to-night, but he declines even to forward a sample at present. The peculiarity of this bottle is that it is covered with pointed excrescences, except where labelled, and therefore cannot be touched without exciting attention. I shall take the earliest opportunity I can of showing it to you. I beg to call your attention also to the bottles with black caps, for dispensing, invented by Messrs. Savory. These I showed you before, but their great utility and beautiful workmanship will bear a second mention. I have had to wait nearly three months for half-a-dozen; I suppose they are so little known. One of these shall be placed in the Museum, for members' inspection. The employment of these most ingenious contrivances to prevent the too free access to poisonous solids, I consider very desirable; nothing that I know of, so well fulfils the necessary qualities of a guarded dispensing powder-bottle; no murderous knife can enter to draw out a fatal dose; time is secured for thought, ere the contents will yield to the operator's wishes. Obstruction to the too facile performance of the act, and forced delay, are of the utmost value in preventing mistakes. I know there is the danger of mistaking one poison for another, and this is urged against using peculiar bottles; but such an objection is equally forcible against every precaution that we know of; and further, the mistaking of one deadly poison for another is a rarer, less probable, less fatal mistake than substituting a deadly poison for a harmless medicine. Further, it narrows the chances down to their lowest dimensions. We can render one substitution almost impossible, and this the more likely and disastrous of the two. Moreover, the virulent poisons and alkaloids are seldom used by the dispenser but in minute quantities, fractions of a grain, and a grain, if we except morphia. I imagine that we seldom use more at one time of bichloride of mercury, strychnine, atropine, aconitine, etc. And who does not see that if we can withdraw these dangerous agents from the sphere of large doses, we have accomplished a great deal, but not rendered a mistake utterly impossible, which is a feat beyond the powers of mortal man?

I have said we must except the morphias, which we do frequently use in larger quantities, and much oftener than the rest of the group. But here is a fact which suggests a remedy; that which is so much used must be withdrawn and isolated from the rest. He must be a hardy man who would keep his morphia side by side with his atropia. And here let me say I think much good might be done by classifying our poisons into, first, deadly; second, dangerous; the latter comprising preparations of colchicum, digitalis, lobelia, etc. The former should certainly be under lock and key; the less deadly may be considered safe if furnished with Bird's poison cork, or tied over with gutta-percha tissue, bladder, or black leather. These arrangements are not only applicable to the dispensing department, but also to our shop rounds upon the shelves containing articles which we retail to the public, such as laudanum, sugar of lead, oxalic acid, etc.

But I must hasten on to mention the other novelties brought forward at the Conference,—bottles that will not stand, as soda-water bottles, tin cases reaching up to the stopper, but having no covers; a metal band for the poison bottle; also in labels, those with white letters on a black ground, and Latin labels by Ford and Shapland, on which the name of the drug is given in large letters, as "Rheum," and the preparation as "Tinct." or "Syrup," is placed beneath it; these I find are not yet ready. Also the use of black wrappers with white letters "Poison" for all dry poisons, such as oxalic acid, sugar of lead, red and white precipitate, etc. The poison cupboard has received the sanction of the Conference, and I think will commend itself to every one's judgment as a wise and efficient precaution against accident.

The Committee took as the basis of their deliberations, the whole of the poisoning cases that were reported for two years past, twenty-five in number; of these 10 cases were mistakes of the administrator, 2 by a surgeon, 1 by a wholesale house, 11 by retail chemists or their assistants. With respect to these, they say that "there are 17 of the 25 cases of accidental poisoning, in which there is every reason to believe that a thoroughly effective poison-bottle would have prevented the accident; next, that there are three cases in which, had the poison sold been wrapped in paper of distinctive character, and labelled as suggested, there is reason to believe that the accident would not have occurred. Thus we have (they say) encouraging assurance that at least 80 per cent. of the usual cases of accidental poisoning may hereafter be prevented by the use of such means."

There is another aspect of this important subject to which I must refer, and that is Government interference with our business. You are generally aware, no doubt, that the medical officer of the Privy Council has reported upon the subject, and called to his aid Professor Taylor, who has also drawn up a very lengthened report on the matter. Both these documents relate to "poisoning, and the dispensing, vending, and keeping of poisons," and, as has been said, are the most important that have for many years appeared, and are "big with the fate of pharmacy." Those who have not read these papers should do so, that they may be prepared to discuss the question when the time for action comes. The great organ of the Press has also announced its opinion "that the present state of things ought not to be allowed to exist." It is not then very difficult to prophesy that before long some Government enactment will be passed, setting at rest those vexed questions which have occupied our attention for years past, such as—what is a poison? Can a schedule be so framed as to be a useful restriction without being a vexatious hindrance to trade? Second, who are to be considered qualified to dispense and deal in poisons? Third, how should poisons be stored? and fourth, is inspection necessary? The great fear is not that legislation will take place, but that it will be hasty, and the result of present apprehensions from recent events, and will not do justice to all classes of druggists. It is greatly to be desired that this subject should be left to those who alone are competent to cope with its intricacies and great difficulties; I mean those who practically know the working of the business. It would be far better for us as a body, and more likely to secure the interests of the public too, who must and will have poisons in many cases with as great facility as possible, if the Pharmaceutical Society and the United Society of Chemists and Druggists would agree upon one measure, to comprise the whole trade.

A measure that is too stringent will become a dead letter, its effect would be to demoralize more than to restrain. To register, for instance, the sales of laudanum, oxalic acid, sugar of lead, and precipitates, no Act of Parliament that could be devised could possibly enforce.

If the Government should appoint an Examining Board independent of the Pharmaceutical Society, the license of such a board would be a serious rivalry to their examination; it would satisfy the outsiders themselves, and satisfy the public, and so retard a consummation much to be desired—the enrolment of the whole trade under that one distinguished society. If, on the other hand, the Government make the Pharmaceutical Society the examining body, whose diploma shall give the only right to exercise pharmacy in this country, then it is clear the examination must be made such as can fairly be required of men already in business as masters or assistants, and also be without any, or with only nominal fees.

A man who has served a regular apprenticeship of five years to a chemist and druggist, so long as that continues to be a trade, and not a profession, has obtained an equitable right to deal in every article used in that trade. Such a man need have no fear of submitting to any examination on the subject of poisons, which the Government are likely to render compulsory; he must have spent his five years much worse than poor

Berzelius did his schooling, who at the end of that time is unable to discriminate between rhubarb powder and opium powder, or between arsenic and farinaceous matters. Professor Taylor's first suggestion is, "that none but qualified persons, educated to the trade of druggists, should be allowed to vend by retail drugs or medicines capable of acting as poisons." This is most excellent; the only question at issue is the amount of education fairly to be demanded of a tradesman; one, for instance, who has to supply a low, unhealthy, dirty neighbourhood of a town with drugs. Can you expect a highly educated man to settle there and deter others? The case of small towns, villages, and poor neighbourhoods must be met. The second suggestion is to prohibit grocers and other trades selling poisonous drugs; but this, to be of any use, ought to prohibit their selling any medicines at all, if they know not their nature, appearances, and doses. Number three restricts the sale of certain specified poisons to Pharmaceutical Chemists and apothecaries, and speaks of a "proper examination" for other persons acting as druggists. Number four forbids boys and girls who cannot read or write, selling poisons. Five forbids dispensing or selling poisonous drugs by any youth under eighteen years of age, nor then, unless he have been one year under a Pharmaceutical Chemist or apothecary, or have been examined. Now here is a case of singular ignorance of what is at all feasible. Youths almost invariably go to business at fifteen years of age, which is on the whole a wise plan. If for three years they be not allowed to sell *any* poison, or even for one year, I should like to know how they can learn the trade. Six relates to keeping similar-looking drugs apart. Seven, to restrain the sale of deadly poisons. Eight, to forbid sales of poison to any under twenty years of age, and only with a witness. This again is simply absurd, if intended to apply to a great variety of poisons that will instantly suggest themselves to your minds. Nine, all poisonous drugs to be labelled. This all respectable men do, perhaps very few druggists omit it; but added to the label is to be the date of sale. This might perhaps be done for a few weeks after the passing of the Act,—not, I fear, longer; its uselessness in 999 cases in 1000 would soon lead to its disuse. Ten relates to storing and labelling large quantities of noxious substances, which would principally oppress our wholesale brethren. The inspection of all depositories, whether they be kept by surgeons and apothecaries having open stores, in hospitals, dispensaries, druggists' shops, wholesale houses, or manufactories, is the only way I see of making any regulation for storing poisons, really effectual.

I cannot better bring these remarks to a close than by reading the following extract from the report of the medical officer of the Privy Council:—"Dr. Taylor concludes his report with suggestions which deserve to have much weight, as to the reforms which are desirable in the conduct of pharmaceutical business. His fundamental opinion, that poisons, and medicines likely to act as poisons, ought not to be sold in retail except by properly educated persons, and under some other reasonable restrictions as regards both seller and purchaser, is an opinion which I submit for consideration as one in which I entirely concur. And it seems to me that this object might be attained without giving the drug trade any reasonable ground of complaint, and without inconveniencing the public as regards the purchasability of non-poisonous drugs. Facilities might be given to druggists to divide themselves into an upper and a lower class. At first such a division might be made by an enactment constituting into an upper class all who had previously passed an examination as Pharmaceutical Chemists or as apothecaries; perhaps with the further addition of all who at the time of the making of the enactment should be in *bonâ fide* practice as druggists on their own account, provided their trade as druggists were conducted separately from all other trade; and, subsequently to the first constitution of this upper class, admission into it might be obtained on examination before some appointed authority or authorities. To persons of this class (but with express exclusion of general shopkeepers) the office of selling poisons might be restricted. As the purchasability of poisons by the public might at the same time be made effectually subject to the rule which now ineffectually relates to the purchase of arsenic;—that no such sale shall be made except with full registration of the buyer's name and residence, and of the time, quantity, and proposed purpose of his buying; nor, even thus, to any person unknown to the seller, unless in the presence of a witness acquainted with both seller and buyer. But whether or not provisions like these may seem to the Legislature fit and proper for enactment, I must submit that, with or without such enactments, one particular act of legislation is urgently wanted in the matter,—an act, namely, which, either by its own language, or by empowering some department of the Government to make regulations in the matter, shall directly or indirectly provide for the establishment of a legal criterion as to what is *culpable carelessness* in the sale of drugs and poisons, and shall thus render every such carelessness an offence punishable at law."

I wish that I had the time and ability to go further into this subject, but here I must stop. The foregoing remarks I feel to be exceedingly crude, and unworthy of the occasion; but such as they are, I hope you will receive them in the spirit of kindness and candour in which they are made. I can only thank you, Gentlemen, for the patience which you have exhibited, and apologize for thus detaining you to this protracted hour.

Mr. N. Mercer eulogized the able and lucid address with which the President had favoured them, and augured from it the success that would accrue to the Association from the guidance of the worthy head during the session.

The proposition was seconded by Mr. J. H. Shaw in appropriate terms, and unanimously acknowledged.

The President returned thanks, and called upon the Hon. Secretary to read "The Suggestions of the late Pharmaceutical Conference at Bath," which was to be the subject of discussion of the evening.

The discussion was opened by Mr. N. Mercer, who passed the several "suggestions" in review, remarking upon their comparative merit and practicability. He concluded by asserting that considering there were at least 10,000 prescriptions compounded in this kingdom *daily* by the profession, nothing could testify more strongly to the great care and vigilance of dispensers, than the fact that during two years only *eleven* mistakes were recorded against them, in the 'Pharmaceutical Journal.'

Messrs. Shaw, Dutton, Jones, and Bird also submitted their views, but the lateness of the hour precluded the members from entering more fully into the subject.

The second General Meeting was held at the Royal Institution on Thursday evening, October 27,—the President, Mr. A. Redford, in the chair.

Mr. G. F. Williams was duly elected a Member of the Association.

The following donations were announced to the Library and Museum, and the thanks of the Meeting awarded to the donors:—'The Chemist and Druggist' for the current month, *from the Society;* a sample of Scammony Root, collected near Killis, Asia Minor, in 1864, from Mr. William Ransom, of Hitchin, per, and by request of, Mr. J. Abraham.

The President announced the steps which the Council had taken towards having the Library placed at the Royal Institution, and then called upon Dr. Edwards for his address relative to the "suggestions" of the late Pharmaceutical Conference at Bath.

Dr. Edwards opened his remarks by referring to an expression of the late Mr. Jacob Bell, to the effect "that it was an unsafe thing to place a weak fence around a pit that was considered dangerous," and continued by alluding to the various "fences" which had been suggested to guard against "accidental poisonings," such as sand-paper labels, encased and spurred bottles, etc. etc.; contending, however, that the safest "fence" was a sound education, which warned the Pharmaceutist of danger more thoroughly than any of those referred to. He then dwelt upon the advantages which a good education conferred, showing that, in addition to other qualities, it induced habits of careful attention and precision in the various duties of the shop. He concluded an interesting address by inculcating the application of the adage, "Take care of the pence, and the pounds will take care of themselves," to the dispensing of medicine, implying by "the pence" innocuous drugs, and by "the pounds" poisonous ones.

Mr. N. Mercer, after complimenting Dr. Edwards, referred to the Pharmaceutical class, in connection with the Association, as a great means for imparting that degree of education to which Dr. Edwards alluded, and regretted that such use was not made of the laboratory as was anticipated by the Association, and which the benefits derivable from it merited.

The President and Dr. Edwards further referred to the advantages which would accrue to the members by studying in the laboratory, and expressed their hopes that it would be more generally patronized for the future.

Dr. Edwards occupied the remaining part of the evening with a discourse upon the properties of "Light" as indicated by the spectrum, in the course of which he showed the difference which is manifested by sunlight and the light emitted from the combustion of other bodies. He pointed out the variation of refrangibility of the principal rays composing polychromatic and monochromatic light, and exhibited, by means of Geisler-tubes and a solution of sulphate of quinine, the fluorescence of those rays of light not ordinarily observed in the violet part of the spectrum of sunlight. In reference to the dark lines observed in the latter spectrum, he considered them as being due to the absorption of certain metallic vapours evolved from the heated mass of the sun by the luminous atmosphere which surrounds him; and with regard to the actinic or chemical rays which exercise a chemical effect upon certain salts, he stated that these rays were found to exist largely in the light evolved from the combustion of magnesium. Finally, several spectra of rarified gases were exhibited for the inspection of the members through the spectroscope.

A vote of thanks to Dr. Edwards concluded the business of the evening.

The third General Meeting was held at the Royal Institution on Thursday evening, November 10,—the President, Mr. A. Redford, in the chair.

The following gentlemen were duly elected members:—Mr. Daniel Lomas and Mr. Joseph Rodgerson.

The following donations to the Library and Museum were announced, and the thanks of the meeting voted to the donors:—'The Journal of the Liverpool Polytechnic Society' for November, from *the Society;* 'The Technologist' for November, from *the Editor;* a sample of pure Crystallized Phenic Acid, from Mr. Charles Lowe, of the Phœnix Works, Newton Vale, near Manchester, per Mr. Edward Davies, F.C.S.

Mr. E. Davies, F.C.S., read a paper on "Carbolic Acid." After referring to the valuable products obtained from coal-tar, he stated that this one would probably become the most important. Though used for several years in a crude, impure state, it has only been prepared pure during the last three years by Messrs. Calvert and Lowe. As now obtained in a pure state, it is a colourless crystalline solid body, possessing most extraordinary antiseptic properties. One part of this substance added to five hundred parts of glue or flour-paste will keep them perfectly sweet for years. Hides steeped in a solution of it in water, and then dried in the sun, have been brought from Monte Video without emitting any unpleasant odour. Extracts of colouring-matters, especially those containing tannin, are also preserved unchanged by the addition of a very small quantity of this acid. In medicine, carbolic acid has also been used most successfully in the treatment of skin diseases, ulcers, sloughing wounds, toothache, and internally for dyspepsia. In veterinary practice it has been found to be a specific for foot-rot in sheep, and has proved very effectual in curing grease and canker in horses. Various dyes are obtained from carbolic acid; they are called picric or carbazotic acid, peonine, azuline, and aurine. The last-named is a new dye for silk, producing a splendid orange colour. Carbolic acid is being used by Mr. M'Dougall for disinfecting sewage before applying it on land. The fine grasses which would otherwise be destroyed are not injured by the disinfected sewage. The paper concluded with showing how manufactures and science had mutually benefited by their alliance in this as in many other instances.

After the reading of the paper, a brief discussion, in which Mr. Mercer and Dr. Edwards took part, followed.

A vote of thanks to Mr. Davies brought the business of the evening to a close.

LEEDS CHEMISTS' ASSOCIATION.

The Second Annual Meeting of the Leeds Chemists' Association was held at the Mechanics' Institute on the evening of October 19th, 1864. In the absence of the President, the chair was taken by Mr. E. Thompson.

The Honorary Secretary read the following Report:—

The Committee are pleased to have the opportunity of again meeting the Members and presenting the Second Annual Report.

The Committee regret that during the past year two members have been removed by death, Mr. George Reinhardt and Mr. E. Smeeton, a deserved tribute to whose memory appeared in the proceedings of our Association.

The monthly meetings of the Association have been supplied with papers or lectures as follows:—1863, November 11th, "Beeswax and its Adulterations," by Mr. Reynolds, F.C.S.; December 8th, "Materia Medica," by Mr. E. Thompson; 1864, January 13th, "Medicated Waters," by Mr. E. Brown; February 24th, "Iodide of Potassium," by Mr.

F. C. Clayton, Associate; March 9th, "The Value of the Marc left in the preparation of Tr. Opii by Maceration," by Mr. R. H. Davis, Harrogate; March 9th, "Liq. Ammon. Acet., B.P.," by Mr. R. M. Atkinson; April 13th, "French Pharmacy," by Mr. D. H. Cussons, Associate; May 18th, "Lin. Saponis, B.P.," by Mr. J. Abbott; May 18th, "Remarks on the Value of the Marc left in the preparation of Tr. Opii by Percolation," by Mr. E. Yewdall. The character of several of these papers was such as to render them exceedingly interesting and instructive, while each offered ample scope for discussion, an opportunity not missed by those who were present.

An extraordinary meeting of the Association was held January 27th, at which Mr. J. S. Blockey gave a lecture on "Aniline Dyes."

The Committee arranged with Mr. E. Thompson to give a course of lectures on "Materia Medica," for which fifteen tickets were taken, and several of the Associates attended with commendable regularity.

During the past year the library has received some important additions, amongst which will be found Miller's 'Chemistry,' in 3 vols.; Pereira's 'Materia Medica,' in 3 vols.; 'Garrod on Medicines,' Galloway's 'First Steps in Chemistry,' Sutton's 'Volumetric Analysis,' and Wittstein's 'Practical Pharmacy;' together with the following periodicals:—'Pharmaceutical Journal,' 'Chemist and Druggist,' 'Intellectual Observer,' 'Technologist,' 'The Chemical News,' Bentham's 'British Flora.'

From this recapitulation it will be seen that the objects of the Association have been steadily kept in view, and that the Committee have endeavoured to give attention to the important duties assigned to them.

A report has been presented to the Privy Council by Dr. A. S. Taylor, "On Poisoning, and the Dispensing, Vending, and Keeping of Poisons," which has been published by authority. It is evident, therefore, the consideration of Government continues to be given to this important question, to which also recent events have strongly drawn the attention of the public. It is far from improbable that some further attempt may be made at no distant date to regulate the sale of poisons by law. While it is obvious that no absolute safeguard can be devised, it is not less certain that the greatest attainable security to the public from accident in the use of these potent remedies can only be reached by raising the standard of character and education in those who deal in and dispense them.

Since it is the aim of our Association to spread professional and scientific knowledge among us by mutual efforts, and in so doing to increase or confirm the wholesome sense of responsibility under which any right-meaning chemist and druggist carries on his business, the Committee think the present state of the question of Poisons, with all the public and private interests it involves, supplies the strongest motive for continued energy and zeal in carrying forward our "Chemists' Association."

The Treasurer's account was presented, and was as follows:—

Dr. BALANCE SHEET. *Cr.*

1863–4.	£	s.	d.	1863–4.	£	s.	d.
To Balance in hand	5	18	11	By Barrister's Room, two meetings	1	1	0
,, Error in last account	0	4	0	,, Printing, Periodicals, etc.	11	17	0
,, Sale of Tickets—Materia Medica Lectures	5	12	6	,, Lecture Room	1	9	6
,, Thirty-five Members' Subscriptions	17	10	0	,, Rent of Library	8	0	0
,, Forty-two Associates' ,,	5	5	0	,, Reprints from Pharmaceutical Journal	1	16	6
,, Donations to the Library	3	0	0	,, Advertisements	0	13	0
				,, Envelopes	0	7	9
				,, Oiled Cloth	0	7	10
				,, E. Thompson—Materia Medica Lectures	5	12	6
				,, Postages	1	14	9
				,, Balance	4	10	7
	£37	10	5		£37	10	5

Examined and found correct.

JOSEPH HAIGH, T. B. STEAD. } *Auditors.*

The adoption of the Report was moved by Mr. Haigh, seconded by Mr. S. Taylor, and carried.

Mr. Stead and Mr. S. Taylor were requested to act as Scrutineers of the ballot for

Officers for the session 1864–5. The result of the election was as follows:—President, Mr. Joseph Haigh; Treasurer, Mr. J. Laud; Secretary, Mr. E. Yewdall; Librarian, Mr. R. M. Atkinson; Committee, Messrs. Jefferson, Reynolds, Stead, B. Taylor, Thompson, and Ward; Auditors, Messrs. Bilbrough and Reinhardt.

The thanks of the meeting were offered to the retiring officers.

ORIGINAL AND EXTRACTED ARTICLES.

THE APPLICATION OF THE STARCH TEST FOR DETECTING IODIDE IN BROMIDE OF POTASSIUM.

BY MR. WILLIAM HUSKISSON, JUN.

Having been much engaged in the preparation of bromide of potassium, and having taken every precaution for ensuring a perfect salt, both as regards its purity and general characters, some weeks since my attention was directed to the fact that it contained iodide, or traces of iodine.

In the 'Chemical News' of Saturday last, the 19th inst., Mr. F. Fewtrell states:—"Recently it has been observed that bromide of potassium administered in large doses has been occasionally followed by symptoms of iodism, or the peculiar affections which are sometimes produced by excessive doses of iodine or iodide of potassium; as no such effects followed the use of the pure bromide, the circumstance gave rise to a suspicion of the presence of iodide." He further states,—"Having procured a sample which was labelled 'bromide of potassium, French,' which was well crystallized, the crystals being perhaps rather more opaque than those of the pure bromide, on a quantitative analysis being made it showed the presence of iodide of potassium to the amount of twenty per cent.*

To the suspected solution of the bromide of potassium I had prepared, the following tests were applied:—A few drops of solution of chlorine were added, then a few drops of bisulphide of carbon. The bead that was formed remained colourless, or turned slightly yellow. Had the bromide contained more than traces of iodide, the bead would have collected the iodine developed by the chlorine and changed it to a rose colour of surpassing beauty, which, in the course of a few hours, would again change on the further collection of iodine to a rich violet colour, which would remain permanent. A little chlorine gas was then brought in contact with the solution, which failed to separate any iodine. On the addition of nitrate or chloride of palladium, a slight brown tint was communicated to the solution; and after the lapse of some hours a slight brown precipitate separated.†

The solution was then mixed with boiled starch, and a drop of solution of chlorine, or what is still better, a breath of chlorine gas passed over the surface, the blue iodide of starch was instantly developed. The solution of bromide was then mixed with boiled starch, and acidified with hydrochloric acid. On and addition of nitrite of potassa, the presence of iodine was manifest. Dr. Price has detected $\frac{1}{4000000}$ part of iodine dissolved in water as iodide of potassium by this means. If much iodine is present, a dark blue colour will instantly

* This would represent 15·3 per cent. of iodine. It should be observed that French bromide of potassium is sold at less than it would cost the English manufacturer to produce it.

† Iodide of potassium occasions a black precipitate with nitrate or chloride of palladium. If chloride of palladium be added to a solution of one part of iodide of potassium in 400,000 of water, it produces a brown tint.

be developed; if a very small quantity, as for instance the two- or three-millionth part, then a few seconds elapse before the blue colour makes its appearance; this test admits of exceeding delicacy.

My attention was now directed to a sample of bromide of potassium said to be pure, or free from iodide. The peculiar appearance of this salt led me to suspect the presence of an alkali, or that the combination was not quite perfect, instead of the well-defined cubes so characteristic of well-combined bromide of potassium. The opacity and crystalline form is one of the best indications of its purity and skilful manipulation, and the presence of iodide does not affect the crystalline form or opacity of the bromide. Further, when iodide of potassium is prepared by many of the processes recommended, it has a predisposition to decompose and the crystals become yellow or pink, although almost pure, and form iodate, which has never been found to be the case with bromide. I have furnished an interesting specimen of bromide of potassium crystallized under peculiar circumstances, the geometrical form being apparently that of a flat parallelopiped, but still representing the internal structure of a cube. It will be observed, as in iodide of potassium, the plates forming butterflies' wings are not thicker than bank-note paper. I here furnish some well-defined opaque cubes of bromide with five perfect faces, as well illustrating the marked difference between the bromide and iodide.

To a solution of the above salt starch and chlorine were added, without the slightest development of iodine. A minute quantity of nitric or hydrobromic acid was then added to the solution previous to the application of this test.* This addition caused the instantaneous development of iodine on the application of starch and chlorine. A few drops of solution of potassa were then added to the salt that I had prepared, which indicated iodine with starch and chlorine. Since this addition of potassa, the evidence of iodine could no longer be traced on the application of starch and chlorine. Having obtained samples of bromide of potassium from various manufacturers, I found, without exception, that they all indicated iodine on the addition of starch and chlorine. Four samples of French bromide of potassium indicated a percentage of iodine on the application of each or every one of the tests here employed; also one sample obtained in London gave similar results. Hence it would appear from the above statement that starch cannot be relied upon for detecting iodine in alkaline solutions, but is of the greatest value in detecting minute traces of iodine in neutral or acid solutions, as it readily developes its presence when almost every other known test fails to do so. I then proceeded to examine the bromine I had operated upon, and on the application of various tests, I readily detected iodine, and also in five samples of bromine of French manufacture. One of the most favourable conditions for examining the bromine for iodine I found to be bromide of ammonium. A sample of the bromine was supersaturated with sulphide of ammonium, the solution was then heated until the excess of ammonia was expelled, and the sulphur precipitated or separated.† If the solution be now concentrated by evaporation, the iodine can be readily traced by starch and chlorine. It seems, therefore, more than probable that the processes adopted by the manufacturer for separating iodine from the bromine, either by chlorine or sulphate of copper and sulphate of iron, and its subsequent purification by ether and potash, fail to remove the traces which are developed by starch and chlorine, etc.‡

In the present state of the bromine market, therefore, chlorine and bisulphide

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* I readily obtained hydrobromic acid by decomposing bromide of zinc with oxalic acid.

† If the bromide contains sufficient iodine it will render the sulphur ductile, and it can be traced by starch and chlorine.

‡ A liquid containing $\frac{1}{310000}$ of its weight of iodine receives a blue tinge from a solution of starch.

of carbon seems to be a fair test of ascertaining the value of commercial bromide of potassium.

Swinton Street, Gray's Inn Road.

COMMERCIAL BROMIDE OF POTASSIUM.

BY MR. C. UMNEY.

The adulteration of bromide of potassium noticed in the 'Chemical News' of the 19th, by Mr. Fewtrell, is of the greatest importance, both to the pharmaceutist and medical man; more especially as the adulteration with iodide is not only found in the so-called "French bromide," but even in the salt sold by some of the principal manufacturing chemists in London.

In August last, my attention was called to a sample of bromide of potassium, returned by a country druggist, with a statement that a medical man (whom he had supplied with the salt) noticed all the symptoms produced by iodine upon his patient.

I made a qualitative examination of it, and found it contained a large proportion of iodide.

I immediately procured samples from five of the principal manufacturing chemists in London (who professed to make the salt): of these only one was pure, and this was charged by its manufacturer 6 per cent. less than the impure salt of the other makers.

It is therefore advisable for every pharmaceutist to test his bromide of potassium before using it. This he can readily do by dissolving some of the salt in water, adding to the solution starch, and subsequently a few drops of chlorine water, when if any iodide be present a blue colour will be produced. Although the bromine is set free as well as the iodine, still the bromine does not produce a blue with starch. Nitric acid may be used in the place of chlorine water, but it is not so delicate a test. Chloride of palladium added to solution of the salt containing iodide will give a precipitate of iodide of palladium, the bromide being left in solution; this affords a ready means for the quantitative determination of the iodide present.

40, *Aldersgate Street.*

STATE OF PHARMACY IN FRANCE.

BY MR. CHARLES EKIN.

Whilst questions regarding the vending and safe keeping of poisons, and the education and necessary qualifications of chemists, are engrossing the attention of the pharmaceutical world, it may perhaps be to our advantage if we inquire into the state of Pharmacy in France, for it may be, that we shall find in the system carried out there many points that we should do well to adopt; and we are the more led to expect this from the results of their system, for we find that the statistics ranging over the last ten years, of the Morgue in Paris, and published a few weeks ago in the 'Times,' show that in a number of about 1700 suicides, seven only were the result of poison. We have but to compare these with like statistics in our own country, to see how very much the comparison is in favour of France.

Believing the subject to be one that would be likely to interest the readers of this Journal, I wrote to a friend of mine, a pharmacien at Montauban, in the south of France, requesting him to give me such information as he might consider pertinent, and from his letter in reply, and also from information received through the courtesy of Mr. Daniel Hanbury from Professor Planchon of the École de Pharmacie of Montpellier, I am enabled to give the following abstract:—There are two kinds of pharmaciens in France, those of the first and those of the second class. A pharmacien of the first class must be a Bachelor of Sciences, which is the degree required of students of medicine before entering on their special studies: he must pass twelve terms, occupying a period of three years in a higher school of pharmacy (École supérieure de Pharmacie), or he has the option of passing four terms in a higher school and ten terms in a secondary school of pharmacy (école secondaire); he must then be articled for three years to a pharmacien (trois années de stage dans une officine). In France pupils are said to be "articled" to professional men and pharmaciens, and to be "apprenticed" to grocers and other tradesmen.

A pharmacien of the second class need not be a Bachelor of Sciences, a certificate of the fourth form * sufficing; he must pass one year in a school of pharmacy, keeping either four terms in a higher, or six in a secondary school, and be articled for six years, or he has the option of being articled for four years and keeping eight terms in a higher or twelve in a secondary school. No pharmacien can commence business until he has attained the age of twenty-five.

The examinations for both classes are three; two oral, a day intervening between each, and a third practical. The first examination is in physics, chemistry, toxicology, and in the translation of passages in the 'Latin Codex.' The second is in botany and materia medica, the candidate being required to recognize and describe thirty articles of the materia medica and twenty plants selected at random. The third examination is divided into two parts: in the first, the candidate has to determine the name, etc., of such materia medica as are placed before him, their natural history, chemical properties, sophistications, and the means of ascertaining the purity of their products; in the second, he has to prepare, under the surveillance of the examiners, at the least five galenical medicaments and five chemical products,—he has to describe their properties and characters, and how he has prepared them; this examination occupies four days.

Again, a pharmacien of the first class has a right to commence business in any town in France, and to change to any point at will; his fees on examination are about £56.

The Minister of Public Instruction has the power of granting, and generally does grant on demand to pharmaciens of this class the privilege of commencing business at the age of twenty-four.

A pharmacien of the second class, on presenting himself for examination, must name the department in which he intends to open an "officine," and if, at any time, he wishes to go into another department, he must again submit himself to examination and again pay the fees, and this as often as he changes his department: his examination fees are £33.

No pharmacien is allowed to sell any poison without the order of a medical man or veterinary surgeon, and even then the sale has to be duly entered in a book kept for that purpose, which book is annually inspected by a commission appointed to that end. The commission at the same time examines the general arrangements of the officine with regard to the safe keeping of poisons, and also satisfies itself as to the proper preservation and good condition of the medicaments.

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* In a Lycée there are nine classes or forms, one of which is passed yearly by every pupil of ordinary capacity; as the pupils begin at the ninth form, by the time they obtain their certificate of the fourth form they must have passed six years in study.

So far as the examinations are concerned, in substance, though not in degree, they are the same as those held by the Pharmaceutical Society, but in general education how far we lag behind! We need not wonder now that Mr. Deane and Mr. Hanbury, as they told us at the late Conference, invariably found in their botanical excursions in France the country pharmacien to be a well-educated and intelligent man, but how can we compare such a one with our village chemist?

One other privilege I may name, which I came across the other day in a French law-book, that when a patient dies, among the first claims to be settled are those of the physician and chemist. "Les créances privilégiées sur la généralité des meubles sont celles ci-après exprimées, et s'exercent dans l'ordre suivant: 1°, les frais de justice; 2°, les frais funéraires; 3°, les frais quelconques de la dernière maladie, concurremment entre ceux à qui ils sont dus." Added to this too, it must be remembered that in France no medical man dispenses his own medicine.

I cannot but think that we may gain some hints from these details,—as, for instance, may we not find in "a commission" a solution of the poison difficulty? All seem to agree that it would be advisable to have a set of rules, the due observance of which shall exonerate us before a jury from the charge of carelessness or want of precaution, but there is by no means the same happy unanimity of opinion as to what those rules should be; and when we consider, not only how much businesses vary in their nature, but even shops in their arrangements, it must be seen that it is impossible to lay down regulations, unless they are of such a general character as to be worthless, which can be made to apply to all. One fears to think what trouble, annoyance, and expense even, we should be put to, in the event of all being obliged to follow set rules as to labelling, poison cupboards, and the like. Perhaps it may be objected that Englishmen would not brook what might be called the prying element of a commission; but shall we not have much more liberty under a system which leaves to every man a choice of detail, always subject of course to the approval of the commissioners?

For a very interesting description of a Lycée, I would refer those who have not seen them to two papers by Matthew Arnold, which appeared in 'Macmillan's Magazine' some eighteen months ago. As he shows, it is a crying evil that we have hardly a good middle-class school in England, certainly not one that will bear comparison for a moment with a French public school, and I venture to think that, until something is done in this direction with regard to the general education of future chemists and druggists, we can hardly hope to raise the status of our business; however, it will be very long, I fear, before the Board of Examiners of our Society will be able to exact from its students, not only a three years' course of study at its laboratories, but a degree, like the French Baccalauréat-ès-Sciences, which is esteemed at all events as high and is much more difficult to obtain than the degree of Bachelor of Arts of our own Universities; of course the increased expenditure of both time and money would be amply met in the increased remuneration and higher standing of our business, or, as it might then be justly called, profession.

STATE OF PHARMACY IN FRANCE.

PARIS, *August* 23*rd*, 1864.

Gentlemen,—I send you the following extracts from 'La Ruche Pharmaceutique' for August, as curious illustrations of the present state of pharmacy in France. You may possibly think them worth insertion in your Journal.

S. J. WESTON.

EXTRACTS FROM THE REPORT OF THE COMMISSION APPOINTED BY "LA SOCIÉTÉ MÉDICALE DU PANTHÉON" ON THE "EXERCISE OF PHARMACY, AND ITS RELATIONS TO THE MEDICAL PROFESSION AND THE PUBLIC HEALTH."

The Commission was composed of MM. Blondeau and Deschamps, pharmaciens, and MM. Domerc and Saudras, medical practitioners.

"The Commission is unanimous in recognizing that the best means of preserving their reciprocal interests and prerogatives is to take, as the only limit of their professions, the advantage and safety of the public health. They point out the weakness of the present law, which dates from the year XI. of the Republic, and which is only a reproduction, in many points imperfect, of the law of Louis XIII. This law prohibits secret remedies, and they swarm. It forbids the advertisement of secret or new preparations, and the newspapers are filled with them. Pharmaciens ought not to supply medicines but with a physician's prescription, yet, for the most part, as much medicine is sold without them as with them. They ought to confine themselves to the formulas of the Codex, yet many use other formulas; and it thus happens that a medical man does not always obtain for his patients the medicine he desires. A great number of pharmaciens give daily consultations, some by prospectuses or pamphlets, others *vivâ voce*, and often in open consulting rooms and at fixed hours.

"Finally, as this law neither defines a secret medicine nor a recognized medicina weight, it results that mineral water manufacturers, druggists, colour merchants, photographers, perfumers, liqueur manufacturers, grocers, herbalists, seed merchants, sisters of mercy, somnambulists, homœopathists, and a crowd of pretended chemists and charlatans exercise medicine and pharmacy more or less illegally, to the great dishonour of these honourable professions. They impose upon the public with lying advertisements, and often with ignorance as dangerous as it is vulgar. A new legislation, giving greater protection to pharmacy and medicine, is thus become necessary."

The Society adopted the following propositions:—

1. No one shall exercise medicine but a legally qualified medical man.
2. No one shall exercise pharmacy but a legally qualified pharmacien; and in those places where there is no pharmacien, the duties shall be fulfilled by the medical practitioner.
3. The pharmacien *only* has the right to prepare and sell medicines.
4. Every substance or preparation shall be considered a *medicine*, which shall be supplied to the public as suitable to combat or prevent one or more diseases. The Codex will give a list of preparations which have come into general use, and which may be supplied without a prescription.
5. Every simple or compound medicine shall be considered secret whose formula is not published in the French Codex, unless it be accompanied by its formula completely detailed.
6. The sale of secret medicines is absolutely prohibited.
7. In the public interest, medical and pharmaceutical advertisements are prohibited in the journals, and especially in the political journals.

The Society decided that the above resolutions should be sent to the Minister of Agriculture and of Commerce, praying him to take them into consideration.

Henry's Magnesia.—M. Henry of Manchester *v.* 46 Pharmaciens of Paris.

For at least half a century the glass manufacturers have supplied for the sale of calcined magnesia moulded bottles, bearing on their sides the inscription "Henry's Calcined Magnesia, Manchester." These bottles are to be found in nearly every pharmacy; they are sold habitually, and without the slightest concealment. Their use is a custom which each pharmacien has received from his predecessor, to which he attaches no importance, beyond its influence on the sale, and which, if he had been requested, he would willingly have given up. The astonishment and excitement was then great, when it was announced that a large number of these bottles had been seized in the pharmacies of Paris, under the instructions of Messrs. Henry. The case, called several times before the tribunals, was decided on the 5th inst., judgment for the defendants; Messrs. Henry to restore the bottles seized, and to pay to each pharmacien 100 francs damages.

PHARMACY IN AMERICA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The following paragraph, taken from a recent letter of the "Special Commissioner" to the 'Daily Telegraph' may, at the present juncture, be worth more than a passing notice. The letter is headed, as usual, "America in the Midst of War," and is inserted in the issue of the above journal for October 13th, 1864. After complaining that fifty cents were asked by "a gentleman in a druggist's shop" for a twopenny box of Palmer's vesuvians, which proved on trial to be "hopelessly mildewed, and wouldn't even smoulder," the writer goes on to say—"Very nearly the same thing happened to me at Niagara. I wanted some seidlitz powders. The proprietor of perhaps one of the most woe-begone little apothecary's shops on the American side I ever saw anywhere, declined to sell me less than a 'family box,' costing two and a half dollars, although he had just sold *ten cents' worth of laudanum* to a barefooted girl, who brought a teacup for the poison. When I opened the 'family box,'" etc.

On reading the above I could not help thinking that if this is the state of the poison question on the other side of the Atlantic, we, of the old country, have little cause to complain about the want of legislative anxiety in our own body, for the safe "dispensing, vending, and keeping of poisons."

With reference to the purchase of the seidlitz powders, the writer in question was a second time unfortunate. "When," says he, "I opened the 'family box,' I found the damp had effected an entrance, and that the contents were utterly worthless." I am quite sure, Sir, that we, on this side, shall all feel sorry for the disappointments of "our special commissioner."

I remain, Sir, yours obediently,

W. WILMOTT.

27, *Bishopsgate Within, October* 21, 1864.

PHARMACEUTICAL RESPONSIBILITY.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—As several correspondents in the Journal, as well as private correspondents of my own, are very strenuously advocating a system of mutual assurance to meet any expenses which might result from a prosecution under Lord Campbell's Act, I wish to offer a few observations in opposition to any plan of the kind. Before the verdict had been issued in the late Liverpool case, several friends foreseeing the inevitable and disastrous nature of the verdict, suggested one or other of the protection schemes which have since appeared in print, but a few minutes' discussion was sufficient to show the dangers into which we should plunge by adopting any such course,—that in fact we should be creating a great evil to get rid of a *comparatively* small one. I have subsequently taken the opinion of an eminent solicitor, whose views perfectly coincide with my own. He says it would be most impolitic and injudicious to adopt any such course. It would invite prosecution on the part of those who, under existing circumstances, would not think of such a thing. We should then indeed become a company, and fairly open to legal proceedings. He instanced the London Omnibus Company as an analogous case. Before it existed, a process against an independent omnibus proprietor was never heard of, though disasters arising from various causes were not unfrequent. But now that a large portion of the omnibus traffic is in the hands of a company, the company is in a constant state of siege by prosecutors on all sorts of pretexts. That is just what we should draw upon ourselves if we took *upon ourselves* to do this thing. Many of the propositions to meet this difficulty have been very plausible, but they all result in the dangerous condition of a company of Mutual Insurers whose objects, position, and condition would be known from one end of the kingdom to the other, and would remain a standing temptation to even the best-disposed persons living. It would be a very different thing if the existing Life and Accidental Insurance Companies were to lay themselves out to grant protecting policies, which they might readily do on very easy terms. In that case the world at large would know no more of what we did in that way than they now do of our life and fire policies, and consequently would not be tempted to prosecute, for we may rest assured that no prosecution would follow an accident unless there was a moral certainty of remuneration in case of a verdict in favour of the appellant,—unless the case were criminal. At present we are, as a body, too poor to excite the cupidity of more than a very small portion of the public, and therefore the chances are ten to one in our favour. The number of *serious* accidents amongst us are very few, and have been greatly exaggerated. At present I have no fear of our being oppressed by the obnoxious Act, but, once let us be united to pay the lawyers, then good-bye to all peace of mind and comfort in the prosecution of our calling; we shall have charged a mine that would explode at the smallest spark.

There is very little chance of our being able to get an alteration in the law to meet our case, and that of many other tradesmen similarly circumstanced as to liability to accident; still I do not despair of finding at least a partial remedy; but until the idea is more fully developed, I shall say nothing about what may after all prove as fallacious and impracticable as its predecessors.

Yours respectfully,

HENRY DEANE.

DEATH BY POISONING.

BY MR. R. GOODWIN MUMBRAY.

When the dispensing chemist has accurately prepared a medicinal compound and sent it out properly labelled, his responsibility ceases; the medicament, whether of an innocent or dangerous character, is equally beyond his control, and is thenceforth confided to the patient or to the nurse.

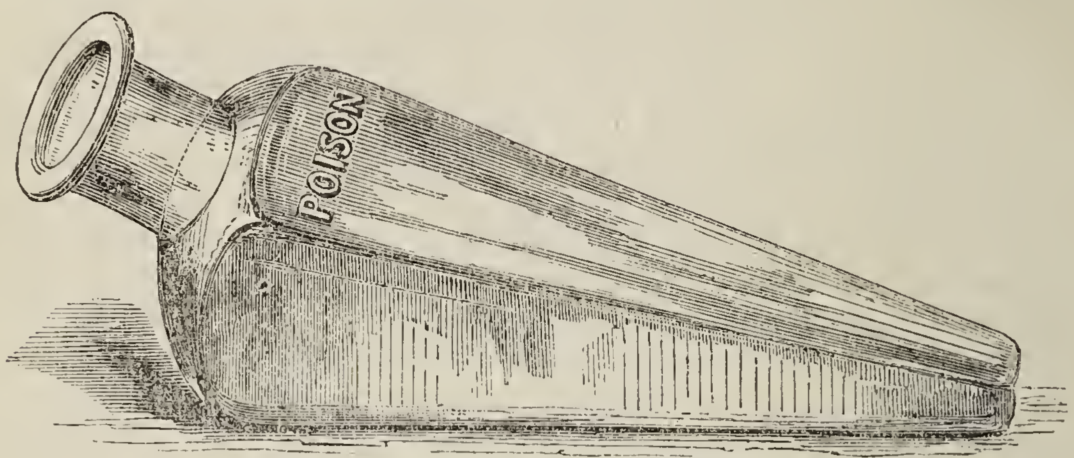
If through carelessness on the part of either fatal or injurious results occur, the chemist is not held blameworthy; but if, on the other hand, a life is lost or injury is sustained in consequence of the dispenser's inattention, he is held amenable to the law, and the finding of a coroner's inquest may result in bringing him to grief.

In order to obviate as far as possible the liability to mistakes, expedients have from time to time been proposed, much ingenuity has been evoked, and considerable sums of money expended in the endeavour to produce what is called a "poison bottle." It is foreign to the purpose of this paper to notice all the numerous inventions and failures which have taken place, the reasons for their rejection have been fully expressed from time to time in the pages of this Journal.

Almost without exception, the whole tribe of inventors have been quietly shelved or altogether ignored. The only really practical "poison bottle" I have seen is that invented by Messrs. Gilbertson and Sons. Its form being a wedge, it cannot be stood upon a shelf in company with other bottles, consequently can never be mistaken for another. The shape, too, is very advantageous, as it does not allow the contents to run out, even when uncorked;

this is no trifling advantage, obviating as it does the possibility of an upset and damage resulting from corrosive solutions, as iodine, etc.

The latest suggestion I have noticed is that made by a representative of the York Glass Company, namely, the "direct square." The discoverer of



Gilbertson's Poison Bottle.

this idea cannot be aware that several leading houses have for some time adopted this form for dispensing, its introduction would therefore only lead to "confusion worse confounded." It is to be feared that if the trade are induced to order these "direct square poison bottles," they will find a place on the same shelf with certain *feeding bottles* brought out by the same firm.

The more practical part of this subject is that which affects the arrangements of a dispensing establishment, in order to guard against fatal occurrences which we too often have to deplore.

The unfortunate young man who was the unwitting agent in sending a fellow-creature, without a moment's warning, into the world of spirits, has enough to bear in the recollection of the sad catastrophe. The sensation produced throughout the country has directed attention of thoughtful men to the preventibility of the recurrence of so grievous a calamity.

It must be candidly acknowledged that nothing can replace that caution and intelligence, the result of scrupulous conscientiousness. The examinations of the Pharmaceutical Society will, it is hoped, tend to weed out the careless and flighty young men who have too often assumed positions for which they are totally unfitted, either by talent or by acquirements, as well as those self-sufficient ignoramuses who, having tried many trades and failed in each, at length settled down and have been admitted (by the great mistake) to the title of Pharmaceutical Chemist.

Poison closets and poison shelves are mere futile expedients which have oftener been proposed than carried into practice. I have not much faith in any plan that has been discussed, but have adopted a very simple and costless method in my own business, it is simply to place the label *longitudinally* instead of *across* the bottle; this difference is so apparent that casual observers frequently notice it. No person, however careless, but must have his attention arrested by this distinction; nor could he, without intention, fill a draught vial with laudanum instead of black draught.

I cannot conclude this notice without alluding to a very common error in speaking of accidents which are not really such. An accident may be defined as an event occurring without any previous warning, or which could not be expected to happen in the ordinary course of things, or the result of principles over which we have no control, as wind, electricity, or fire.

The proper term to use in most cases set down as accidents is inadvertency —*in* and *advertens*—not turning the mind to—negligence—the root and cause of accident. If this distinction were more strictly insisted on, I believe we should less frequently see reports of "Death by Poison."

Richmond, October 19, 1864.

LIQUOR FERRI PERCHLORIDI.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In a lecture on iron by Mr. E. Davies, F.C.S., an abstract of which appeared in the June number of the Journal, the lecturer, while explaining how "the perchloride is best prepared," is reported to have said:—"The process given in the Pharmacopœia is not good, as a sample prepared in strict conformity to its directions gave a dark liquid containing protosalt and nitric acid. On heating more strongly, the solution became muddy from formation of a subsalt."

The next number contained a letter from Mr. A. Utley, endorsing the above statement. He found, however, "that if *twelve* instead of *ten* ounces of hydrochloric acid (sp. g. 1·17) are used . . . a liquor is obtained which *will* answer the tests given," etc.,—the reason being that "*proto*chloride of iron requires *half as much more chlorine* as it already contains to convert it into *per*chloride."

The process in my hands has answered better, and I do not regard the addition above suggested as an improvement.

The quantity of chlorine contained in the hydrochloric acid of the formula is nearly 50 grains greater than that required to convert the whole of the iron into perchloride. But as this is only a scanty surplus, the necessity of avoiding loss as far as practicable is obvious. The nitric acid is in considerable excess, as according to the equation, $6FeCl+3HCl+NO_5=3Fe_2Cl_3+3HO+NO_2$, scarcely $4\frac{1}{2}$ fluid drachms of it take part in the reaction. The temperature required to complete the decomposition is so low towards the end of the process in question, that it seems hardly likely a "dark liquid containing protosalt" should result from failure in this respect.

To give an experiment:—2 ounces of fine bright iron binding-wire, cut into short lengths, were introduced into a long-necked flask and treated with 10 ounces of hydrochloric acid of *correct strength*, diluted with 5 ounces of water, the flask being partially closed by a loosely-fitting stopper. After the lapse of twelve hours, a "gentle heat" was applied to complete the solution of the metal. The liquor was now poured into a capacious evaporating-dish, the nitric acid diluted with the rinsings of the flask added, the whole heated sufficiently to perfect the decomposition and then evaporated to the proper bulk. The product possessed the characters ascribed to it in the Pharmacopœia, except that it was not quite "without smell."

A small quantity of this liquor diluted and heated was mixed with a slight excess of ammonia. The precipitate washed until the washings were free from chlorine, then dried and ignited, gave Fe_2O_3 30·30 grains. To the filtrate and washings acidified with nitric acid, solution of nitrate of silver was added. The precipitated AgCl, after washing, drying, and heating to incipient fusion, weighed 162·34 grains. These weights give the proportion of 56 iron to 106·03 chlorine, and show a deficiency of the latter in the whole batch of rather more than 7 grains, which would leave about 4 grains of iron "unprovided for." To another accurately measured portion of the liquor, diluted and heated, alkaline solution of known strength was added from a burette to faint alkaline reaction. Deducting the quantity required for combination with the known weight of chlorine from the whole quantity used, the difference, calculated for nitric acid, gave a total of 63 grains,—B. P. strength.

Allowing 2 grains for impurity of the iron, the above figures give the following as the composition of this sample of Liquor Ferri Perchloridi :—

Perchloride of Iron	2521 grains.
Pernitrate of Iron	17 „
Nitric Acid, $3HO, 2NO_5$	47 „
Water, sufficient to make up . . .	10 fluid ounces.

If the process be less carefully performed, the amount of free acid will of course be less and that of the pernitrate of iron greater than in this instance. But the presence of a little of this last salt cannot, I presume, be reckoned of much consequence, as, according to Pereira, "altogether this preparation resembles in its medicinal properties the sesquichloride of iron."

The tincture made with this liquor is similar in appearance to a good sample of the P. L. preparation. The colour is, however, a shade lighter and the taste perceptibly more acid.

Dr. Attfield, it appears, advocates the use of the anhydrous perchloride, and considers its preparation a very simple matter ; and so, no doubt, it is to a good manipulator, but I suspect that many of us would find it rather a troublesome business. If great purity were the sole desideratum, it would perhaps be the best plan ; but as a *pharmaceutical* process, that of the Pharmacopœia seems to me to deserve the preference. Only the simplest apparatus is needed for its performance, and by the exercise of a small amount of care and skill it yields a product of uniform strength, and, to borrow a phrase from the last-named gentleman, "sufficiently pure as a medicinal remedy."

Respectfully yours,

JOHN T. MILLER.

Sheffield, October 19, 1864.

POISONOUS PRINCIPLE OF BITTER CASSAVA ROOT.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—On my return from the Pharmaceutical Meeting on Wednesday evening, I turned to Gray's Supplement, 5th edition, 1831, page 39, and found—

"Bitter Cassava (*Jatropha Manihot*) root, full of an acrid, poisonous, milky juice, separable by expression, or corrected by roasting, thus yielding a nutritive farina; also by boiling the juice, which is used as a sauce and made into soy."

Beasley's 'Pocket Formulary' mentions this sauce under the name of Cassareep.

Royle says the juice is acrid and poisonous, owing, it is said, to the presence of hydrocyanic acid, and probably also to an acrid principle.

Gray's testimony seems to favour the idea that the only active matter present in the bitter cassava-root juice is the hydrocyanic acid, unless the acrid principle is also poisonous and dissipated by boiling. While a chemical analysis of this root and the red earth spoken of by Dr. Daniell will doubtless be very instructive and interesting, we cannot dissemble the fact that the chemistry of organic substances, so far as that science is treated of in our schools, is a very finite affair, and for medicine sadly wants associating with physiological tests to be really useful to the medical practitioner; and, to advance the science of medicine, we cannot altogether divorce pharmacy from physiological research, any more than a physician can neglect pharmacy and materia medica in favour of his pathology, or divorce animal chemistry from his physiology.

It surely cannot be wrong for a chemist, any more than it is for a barrister, to be versed in the first principles of physiology. Every intelligent man, in fact, should know the laws of his constitution; and the chemist, above all, who is too apt to overrate the powers of his pet science, should have some smattering of a science so closely allied and so intimately and transcendentally mingled with it.

We cannot value too highly papers like Dr. Daniell's at our evening meetings. In more favoured climes than our own for vegetation, richer in medicinal virtues, yet undiscovered by a Wallich or a Royle, gems may yet be found to adorn the science of medicine,—like quinine, morphia, and strychnia. I have had repeated testimony from men who have had excellent opportunities of judging in India and Ceylon, that even the untutored natives use plants we have no knowledge of in our class-books, to alleviate their sufferings; and I feel certain there is a vast field of research before us, if we could organize some plan to obtain more information about these matters from our immense possessions and other quarters of the globe, and the cultivated intellect brought to bear upon them, which is now but too often exerted uselessly to dress up our own minerals in new garments, to amuse the doctor longing for more reliable remedies, and tantalizing us.

Consumption, cancer, scarlatina, the innumerable maladies of the alimentary tube, the motley skin-diseases, and other disorders of a still more loathsome class, still remain an opprobrium to the healing art, and cry to the same intelligence for help that has afforded the means to stem the torrent of the plague, the cruel variola, and modified at least the awful cholera.

There is indeed much to be done, and to do the work of our generation the doctor and the pharmaceutist must go even more hand-in-hand; and the more we chemists learn, the less shall we be disposed to tread on the heels of the medical practitioner, who, with even his long and varied training, can bring so little to resist the progress of diseases that so often slay prematurely our neighbours and our dearest friends.

"Ignorance makes a lion, where wisdom would a lamb create."

When we consider what the inorganic world has furnished us, how much may we anticipate from a correct and extended appreciation of the organic! that from whence we derive our common sustenance seems naturally that most pregnant with our specific food. We seek not the philosopher's stone, but the Rosetta stone of organic medicine is a prize worth seeking for. And who will be our Napoleon?

I am, your obedient servant,
GEORGE MEE.

8, *Torrington Place, Gordon Square,*
November 6, 1861.

THE METHYLIC ALCOHOL TEST.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Had I been so well acquainted with a Mr. E. Reynolds's proposed method for detecting "wood spirit" previous to the meeting of Conference, as since, I should in all probability have adopted my usual course of saying nothing, unless of a favourable nature, or until a given subject has been fairly tried.

Mr. Reynolds's letter now makes it imperative upon me to state that his proposed method *is of such a complicated and unsatisfactory character that it is open to serious objections;* hence I presume it was, that the following question was proposed by Conference, "Required, an easy method of detecting methylic alcohol in the presence of ethylic alcohol?" Mr. Reynolds has forgotten to state where his proposed method may be found. I herewith supply the omission,—"Wood spirit and its detection," 'Pharmaceutical Journal' for December, 1863. I need scarcely observe that my answer to the above question of Conference is published in full in the November Journal.

John Tuck.

Wilton, near Salisbury, Nov. 19, 1864.

FRAUD AND DEATH.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—A singular circumstance has occurred this last month in the neighbourhood of Temple Bar, which will perhaps be interesting to other chemists, who have not taken active measures in the case, but who may have suffered more or less by a similar fraud, and may have wondered where the miserable trickster has ensconced himself. Alas! ere they again glance through the pages of the ever welcome Pharmaceutical Journal, he has his quietus found, in the grave.

It appears that a man representing himself as a surgeon's dispenser, of a shabby-fine appearance (or I may say,

"Meagre were his looks,
Sharp misery had worn him to the bones"),

has been in the habit of obtaining drugs, such as morphia and chlorodyne, from chemists by means of forged orders purporting to be from a doctor or surgeon close by. As a matter of course, it was soon discovered to be a mode of swindling, and a warrant of apprehension was taken out at Bow Street. On the evening of November 15th he presented a second order at Mr. Pedler's, Fleet Street, and was there detained and identified by Mr. Huggins, Strand, who at once gave him into custody.

Now comes the most extraordinary part of the case. During the time the prosecutors and witnesses were waiting at the Old Bailey, expecting every minute the case to come on, having been before the grand jury, a message came down from Mr. Jonas, the governor of the prison, to say the prisoner had ceased to exist. We leave the case in the hands of our medical friends as to the cause of his death; suffice it to say, it is generally supposed he was an opium eater, and died for want of his daily stimulus.

Apologizing for intruding upon your valuable space,

I am, your obedient servant,

William Whysall.

199, *Fleet Street, November* 23, 1864.

ON THE METAL INDIUM AND RECENT DISCOVERIES ON SPECTRUM ANALYSIS.

(*Delivered at the Royal Institution, by Professor Roscoe.*)

Since the spring of 1862, when the speaker delivered a course of three lectures in this Institution on the Spectrum Discoveries, much has been done to increase our knowledge of Spectrum Analysis; but the whole subject is still in its infancy, and the further we advance the more we find remains to be known.

No less than four new elementary bodies have already been discovered by means of Spectrum Analysis: Cæsium and Rubidium, by Bunsen; Thallium, by Mr. Crookes; and Indium, by Reich and Richter, of Freiberg; whilst the foundations of Solar Chemistry, laid by Kirchhoff, have been rendered more secure by the observations of Cooke, in America; Donati, in Italy; and Miller and Huggins, in England.

Cæsium and rubidium were at first only found in one or two mineral waters; they have since been shown to be widely distributed in the vegetable as well as in the mineral kingdom; they have been obtained in considerable quantities from the beet-root salt, and found in the ashes of tea and coffee, thus proving that they occur commonly in oil; whilst, quite recently, M. Pisani has found that a mineral, called pollux, occurring in Elba, contains 34 per cent. of cæsium: this metal having been mistaken for potash in the analyses which had previously been made of this substance. Thallium and its compounds have been obtained in large quantities, and their properties fully investigated by Crookes and Lamy; whilst this metal has not only been found in iron pyrites, but also in large quantities, by Schrötter, in the mica of Zinnwald, and in lepidolite, from Moravia. Thallium has been shown by Boettger to occur, together with cæsium and rubidium, in the mineral water of Nauheim, near Frankfort. Boettger has, moreover, shown that thallium is contained in the vegetable kingdom: he has found it in the yeast of the vinous fermentation; so that thallium exists in wine, also in treacle, tobacco, and chicory. If 4 lb. of any of these substances are employed, a sufficient quantity of thallium can be obtained as the double platinum-chloride to enable its presence to be easily detected. Professor Bunsen has informed the speaker that he has found a mother liquor from the Hartz, which contains so much thallium, that the iodide can be obtained by direct precipitation at the rate of 10*s.* per lb. The speaker exhibited the spectrum of the Nauheim salt, which contains the three new elements; the spectrum of each metal is well seen by placing the mixed platino-chlorides in the electric arc.

Drs. Reich and Richter, of Freiberg, in Saxony, have lately discovered a fourth new metal in the Freiberg zinc blende.* This metal has been termed Indium, from the two splendid indigo-blue lines which characterize its spectrum. Through the kindness of Professor Richter, the speaker had been placed in possession of a few grains of this new metal, the spectrum of which was exhibited by the electric lamp. In its chemical relations it resembles zinc, with which it is associated in nature; the metal can be reduced before the blowpipe to a malleable bead, when it forms a soft, ductile bead, which imparts streaks to paper on rubbing, and possesses a colour lighter than that of lead, being about the same as that of tin. The metallic bead dissolves in hydrochloric acid with the evolution of hydrogen. The oxide of indium is formed as a yellow fusible incrustation when the metal is heated before the blowpipe on charcoal. Indium differs from zinc in the insolubility of the hydrated oxide in excess of both ammonia and caustic potash. This new element may be separated from all the known metals by precipitating its sulphide in alkaline solution, and by throwing down the hydrated oxide first with ammonia and then with caustic potash; and, lastly, by precipitating the iron with dilute solution of bicarbonate of sodium. The hydrated oxide of indium then remains in solution in the pure state. Indium may be readily detected when present in its pure compounds by the deep purple tint which these impart to flame. The characteristic lines are, however, best seen when a small bead of indium salt is placed between two poles, from which an electric spark passes; the lines In α and In β fall respectively upon divisions 107·5, and 140 of the photographic scale of the spectroscope, when Na $= 50$, and Sr $\delta = 100{\cdot}5$. Up to the present time, indium has been only found in the very smallest quantity, and hence the atomic weight of the metal and the composition of its salts have not yet been determined; in fact, the speaker was led to infer that Professor Richter sent him nearly all the compound of the metal remaining from the investigation of its properties, for the purpose of illustrating this discourse. It has only as yet been detected in the zinc blende of Freiberg; but it will, doubtless, soon be discovered in larger quantities, and its compounds more closely studied.

As regards the spectra of the well-known metals, our knowledge has been much increased by the publication of the second series of Kirchhoff's maps of the solar spectrum and the spectra of the chemical elements (Macmillan and Co.). In these, Kirchhoff has marked the position of the bright lines of no less than thirty metals, and indicated those

* Phil. Mag. for March, 1864, 4th ser. vol. xxvii. p. 199.

which, as they coincide with a dark solar line, reveal the presence of the particular metal in the sun's atmosphere. Kirchhoff's maps now embrace the whole of the visible spectrum from the line A in the extreme red, to the line G in the indigo; beyond these limits the intensity of the light passing through his three prisms became too slight to enable him to draw the lines. The observations thus made of coincidences of metallic with solar lines in the red and indigo portions of the spectrum, confirm the conclusions drawn by Kirchhoff from his earlier observations, with the exception of the presence of potassium. This metal is not seen in the solar atmosphere; the potassium red line is not coincident with the solar line A, as it was supposed to be, nor with any other dark solar line. No metal, in addition to those previously observed, was found to possess lines coincident with solar lines, and hence the number of bodies known to be present in the sun has not been increased.

The experiments of Mr. Huggins on the spectra of the metallic elements, made with an instrument of six prisms, although not yet published in full, promise to add greatly to our knowledge on this subject: one interesting observation may be cited; viz. that the spectrum of sodium has been found to contain three pairs of lines in addition to those corresponding to the dark double line D, and that these also coincide with dark solar lines, adding to the evidence previously possessed of the existence of sodium in the sun. The audience had been already made acquainted with Dr. Miller's important researches on the photographic spectra of the metals, and with the valuable observations made by himself and Mr. Huggins on the spectra of the fixed stars. Connected with this part of the subject may be mentioned Professor Stokes's interesting investigation on the long spectrum of the electric spark, in which he shows that the vapour of certain metals, such as iron and magnesium, when heated by the passage of an electric spark, emit rays of so high a degree of refrangibility, that they are situated at a distance from the lines H, ten times as great as that of the whole visible spectrum from A to H. These highly refrangible rays only become visible at the highest temperatures, and they are not seen in the solar spectrum, although the less refrangible iron and magnesium lines are present; hence it has been suggested that the temperature of the sun must be lower than that of the electric spark in which these lines are developed. This conclusion appears legitimate only if we know that these rays of high refrangibility are not absorbed in passing through our atmosphere; and an investigation of great interest here presents itself for those who ascend into the higher regions of the atmosphere.

The observations of Dr. Robinson upon metallic spectra have led this astronomer to doubt the validity of some of the conclusions arrived at by Kirchhoff concerning the existence of a separate and non-coincident set of lines in the spectrum of each metal. It seems, however, that Dr. Robinson employed only one prism and a low magnifying power, so that we must conclude that the observations from which he deduces the coincidence of certain lines as proving their identity in several metals, cannot impugn the results obtained by help of a larger instrument of sufficient power to resolve these apparent coincidences.

The original statement made by Bunsen and Kirchhoff concerning the spectra of the metals still remains unopposed by a single well-established fact,—the statement, namely, that when a metal is heated up to a certain point, the spectrum of its incandescent vapour contains a number of fine bright lines which do not change their position with increase of temperature, and are not coincident with the lines of any other known substance. There is, however, no doubt of the fact that in the spectra of certain metals or metallic compounds new lines are developed by increase of temperature; and also that certain metals, as calcium, barium, and strontium, yield spectra of two kinds; one of these, seen at the lower temperature, and consisting of broad bands, being resolved at a higher temperature into bright lines. These bright lines do not undergo any further change on elevation of temperature, and characterize the true metallic spectrum, whilst the band-spectrum is probably produced by the incandescent vapour of a metallic compound which is decomposed at a higher temperature.

Our knowledge of the spectra of the non-metallic elements is, as yet, in a very incomplete state. To the researches of Plücker we are especially indebted for information on this subject; he has shown that each metalloid possesses a peculiar and characteristic spectrum; hydrogen, for instance, yielding only three bright lines, all of which are coincident with dark solar lines; and nitrogen exhibiting a complicated series of bands. Plücker has lately come to the conclusion that many non-metallic elementary bodies, and among them sulphur and nitrogen, exhibit two distinctly different spectra when the temperature is altered, in this respect resembling the metals of the alkaline earths. This difference Plücker ascribes to the existence of these elements in two allotropic conditions.

A singular relation with regard to what have been termed the carbon lines was observed by the speaker. It has been stated that all the various forms of carbon compounds, when in the state of incandescent gas, yield identical spectra. This proves not to be the case; the spectrum obtained from the flame of olefiant gas is different from that obtained by the electric discharge through a vacuum of the same gas; whilst the spark passing through a cyanogen vacuum produces a spectrum identical with that of the olefiant gas-flame, and through the carbonic oxide vacuum a spectrum coincident with that of the spark through olefiant gas-vacuum.

As an illustration of the application of abstract scientific principles to useful practical purposes, the speaker stated that he had lately applied spectrum analysis to the manufacture of steel by the Bessemer process. One of the great drawbacks to the successful practical working of Mr. Bessemer's beautiful process for converting cast-iron directly into steel, has been the difficulty of determining the exact point at which the blast of air passing through the molten metal is to be stopped. The conversion of five tons of cast-iron into cast-steel usually occupies from fifteen to twenty minutes, according to the varying conditions of weather, quality of the iron, strength of the blast, etc. If the blast be continued for ten seconds after the proper point has been attained, or if it be discontinued ten seconds before that point is reached, the charge becomes either so viscid that it cannot be poured from the converting vessel into the moulds, or it contains so much carbon as to crumble under the hammer. Up to the present time, the manufacturer has judged of the condition of the metal by the general appearance of the flame which issues from the mouth of the converting vessel. Long experience enables the workman thus to detect, with more or less exactitude, the point at which the blast must be cut off. It appeared to the speaker that an examination of the spectrum of this flame might render it possible to determine this point with scientific accuracy, and that thus an insight might be gained into the somewhat complicated chemical changes which occur in this conversion of cast-iron into steel. At the request of Messrs. John Brown and Co., of the Atlas Works, Sheffield, the speaker investigated the subject, and succeeded in obtaining very satisfactory and interesting results. The instrument employed was an ordinary Steinheil's spectroscope, furnished with photographic scale and lamp, and provided with a convenient arrangement for directing the tube carrying the slit towards any wished-for part of the flame, and for clamping the whole instrument in the required position. By help of such an arrangement the spectrum of the flame can be most readily observed, and the changes which periodically occur can be most accurately noted.

The light which is given off by the flame in this process is most intense—indeed, a more magnificent example of combustion in oxygen cannot be imagined; and a cursory examination of the flame spectrum in its various phases reveals complicated masses of dark absorption bands and bright lines, showing that a variety of substances are present in the flame in the state of incandescent gas. By a simultaneous comparison of these lines in the flame-spectrum with the well-known spectra of certain elementary bodies, the speaker has succeeded in detecting the presence of the following substances in the Bessemer flame:—Sodium, potassium, lithium, iron, carbon, phosphorus, hydrogen, and nitrogen.

A further investigation, with an instrument of higher dispersive and magnifying powers than that employed, will doubtless add to the above list; and an accurate and prolonged study of this spectrum will probably yield very important information respecting the nature of the reactions occurring within the vessel. Already the investigation is so far advanced that the point in the condition of the metal at which it has been found necessary to stop the blast can be ascertained with precision; and thus, by the application of the principles of Spectrum Analysis, that which previously depended on the quickness of vision of a skilled eye has become a matter of exact scientific observation.

Another interesting practical application of our knowledge concerning the properties of the kind of light which certain bodies emit when heated, is the employment of the light evolved by burning magnesium wire for photographic purposes. The spectrum of this light is exceedingly rich in violet and ultra-violet rays, due partly to the incandescent vapour of magnesium, and partly to the intensely-heated magnesia formed by the combustion. Professor Bunsen and the speaker, in 1859, determined the chemically active power possessed by this light, and compared it with that of the sun; and they suggested the application of this light for the purpose of photography. They showed* that a burning surface of magnesium wire, which, seen from a point at the sea's level, has an apparent magnitude equal to that of the sun, effects on that point the same chemical action as the sun would do if shining from a cloudless sky at a height of 9° 53' above the horizon. On comparing the *visible* brightness of these two sources of light, it was found that the brightness of the sun's disc, as measured by the eye, is 524·7 times as great as that of burning magnesium-wire when the sun's zenith distance is 67° 22'; whilst at the same zenith distance, the sun's *chemical* brightness is only 36·6 times as great. Hence the value of this light as a source of the chemically active rays for photographic purposes becomes at once apparent.

Professor Bunsen and the speaker state in the memoir above referred to, that, "the steady and equable light evolved by magnesium wire, burning in the air, and the immense chemical action thus produced, render this source of light valuable as a simple means of obtaining a given amount of chemical illumination, and that the combustion of this metal constitutes so definite and simple a source of light for the purpose of photo-chemical measurement, that the wide distribution of magnesium becomes desirable. The application of this metal as a source of light may even become of technical importance. A burning magnesium-wire of the thickness of 0·297 millimetre, evolves, according to the measurement we have made, as much light as 74 stearine candles of which five go to the pound. If this light lasted one minute, 0·987 metre of wire, weighing 0·120 grammes, would be burnt. In order to produce a light equal to 74 candles burning for ten hours, whereby about 20 lb. of stearine are consumed, 72·2 grammes ($2\frac{1}{2}$ ounces) of magnesium would be required. The magnesium wire can be easily prepared by forcing out the metal from a heated steel-press having a fine opening at bottom. This wire might be rolled up in coils on a spindle, which could be made to revolve by clock-work; and thus the end of the wire, guided by passing through a groove or between rollers, could be continually pushed forward into a gas or spirit-lamp flame, in which it would burn."

It afforded the speaker great pleasure to state that the foregoing suggestion had now been actually carried out. Mr. Edward Sonstadt has succeeded in preparing magnesium on the large scale, and great credit is due to this gentleman for the able manner in which he has brought the difficult subject of the metallurgy of magnesium to its present very satisfactory position.

Some fine specimens of crude and distilled magnesium, weighing 3 lbs., were exhibited as manufactured by Mr. Sonstadt's process, by Messrs. Mellor and Co., of Manchester.

The wire is now to be had at the comparatively low rate of 3*d.* per foot;† and half an inch of the wire evolves, on burning, light enough to transfer a positive image to a dry collodion plate; whilst, by the combustion of 10 grains, a perfect photographic portrait may be taken, so that the speaker believed that for photographic purposes alone the magnesium light will prove most important. The photo-chemical power of the light was illustrated by taking a portrait during the discourse. In doing this the speaker was aided by Mr. Brothers, photographer, of Manchester, who was the first to use the light for portraiture.

H. E. R.

A COLOURLESS VARNISH.

At the time the process of varnish-making by Luning was laid before the Society of Arts, Mr. Field put in a claim, when both the processes and products were found to answer the intended purpose, and the claimants were awarded twenty guineas each. Mr. Field describes his process as follows:—Six ounces of shellac, coarsely powdered,

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* Phil. Trans. 1859, p. 920.

† From Messrs. Johnson and Matthey, of Hatton Garden.

are to be dissolved by gentle heat in a pint of spirits of wine; to this is to be added a bleaching liquor made by dissolving carbonate of potash, and then impregnating it with chlorine gas till the solution becomes slightly coloured. Of this bleaching liquor add one or two ounces to the spirituous solution of lac, and stir the whole well together. Effervescence takes place. When this ceases add more of the bleaching liquor, and thus proceed till the colour of the mixture has become pale. A second bleaching liquor is now to be added, made by diluting muriatic acid with thrice its bulk of water, and dropping into it pulverized red lead till the last added portions do not become white. Of this acid bleaching liquor small quantities at a time are to be added to the half-bleached lac solution, allowing the effervescence which takes place on each addition to cease before a fresh portion is poured in. This is to be continued until the lac, now white, separates from the liquor. The supernatant fluid is now to be poured away, the lac well washed in repeated waters, and finally wrung as dry as possible in a cloth. The lac obtained by the foregoing process is to be dissolved in a pint of alcohol, more or less, according to the required strength of the varnish; and, after standing for some time in a gentle heat, the clear liquor—which is the varnish—is to be poured off from the sediment. When the processes of Luning and Field came before the Society of Arts, the editor of the 'Franklin Journal' (Philadelphia) made known the process of Dr. Hare, in which he stated that "all the objects sought for were perfectly attained, and left nothing to desire, save on the score of economy." The following was Dr. Hare's process:—Dissolve in an iron kettle one part of pearlash in about eight parts of water, add one part of seed or shellac, and heat the whole to ebullition. When the lac is dissolved, cool the solution, and impregnate it with chlorine till the lac is all precipitated. The precipitate is white, but its colour is deepened by washing and consolidation. Dissolve in alcohol. Lac bleached by this process yields a varnish as free from colour as any copal.—*British Journal of Photography.*

THE BRITISH PHARMACEUTICAL CONFERENCE AND THE AMERICAN PHARMACEUTICAL ASSOCIATION.

At the first sitting of the Conference at Bath, September 14, the President stated that he had received a communication from the Secretary of the American Pharmaceutical Association, informing him that an address of salutation and gratulation had been agreed upon, an engrossed copy of which had been forwarded to the present meeting. The President further explained that, owing to some accident, the said engrossed copy had not come to hand, but recommended that the extract from the volume of Proceedings, relating to the resolution, should be accepted in its place, which was immediately agreed to, and the Secretaries were ordered to draw up the draft of a reply, to be submitted for the approval of a future sitting.

At the final sitting of the Conference, on September 19th, it was determined that the following resolution should be forwarded to the American Pharmaceutical Association, in reply to its address:—

Resolved:— That the members of the British Pharmaceutical Conference have received with much satisfaction the friendly greetings of their brethren of the American Pharmaceutical Association. They appreciate these expressions of goodwill the more highly, from their being spontaneously offered at so early a stage in the existence of their own Society, and they see, in this circumstance, evidence that their American brethren are watchful observers of all endeavours for the advancement of pharmacy wherever made. The members of this Conference trust that such an example will not be without its influence in this country, and desire to record their feeling that the scientific labours of American pharmaceutists are worthy of being more extensively known in Great Britain than has been the case hitherto.

"This conference heartily reciprocates the expression of feelings of interest and goodwill towards the American Pharmaceutical Association, and will gladly embrace all opportunities for communication with its members, several of whom are honourably known in England through their scientific researches."

MISCELLANEA.

Accidental Poisoning by Strychnia.—An inquest was commenced at York, on Monday, November 21, respecting the death of Elizabeth Nuttall, wife of Henry Nuttall, a brass finisher, living near Oxford Street, London. Deceased was a native of York, and was visiting there at the time of her death, for the benefit of her native air. For twelve or thirteen years she has been subject to palpitation of the heart, and during the whole of that time had taken morphia for its relief. Her husband had also, from illness, been addicted to morphia, taking as much as thirty grains a day; but believing that it did neither himself nor his wife good, he gradually broke off the habit. On Saturday afternoon, Mrs. Nuttall sent to the shop of Mr. Hardman, druggist, of York, for five grains of morphia, and her daughter brought back with her a powder closely resembling it. Mrs. Nuttall at once took it in water, but instead of finding relief, was attacked with what at first appeared to be spasms, but which subsequently, from the arching of the back, the clenching of the hands, and other symptoms, led to the belief that she was labouring under the influence of strychnia. She died in half an hour from the time of taking the powder. Deceased's daughter said her mother, before taking the powder, remarked that it swam on the surface of the water, instead of sinking to the bottom as usual. She was served with the powder by a Christopher Powell, who had not served her before. At the time the daughter went for the powder, Mr. Hardman was absent, and the bottle from whence the poison was served was in a drawer with other poisons, one of which was strychnia. Powell is a porter in Mr. Hardman's establishment, can read labels, and had frequently served various other articles before. The jury adjourned the inquest for the purposes of a *post mortem* examination and analysis of the contents of the stomach.

Fatal Explosion at a Match Manufactory.—On Saturday, Nov. 5th, an inquest was held relative to the death of Michael Murphy, aged 12 years, who lost his life by an explosion in a match manufactory at Stratford. It appeared, from the evidence of Philip Debor, a German, and foreman at Messrs. Smith's factory, that "Vesuvian lights" were being made, and that the materials in which the matches were dipped, and which consisted of gum, phosphorus, nitre, chlorate of potash, Venetian red, and plaster of Paris, were being stirred with a stick by the deceased, when the explosion took place. Witness said he told the boy to "stir him von leetle bit," but supposed he must have struck the compound violently. It appeared, however, that the chlorate of potash had not been moistened, as was generally the case. The deceased was the eldest of fifteen children employed in making these matches. The jury returned the following verdict:—"That the deceased died from asphyxia through an accidental explosion, while he was engaged in stirring a composition for the manufacture of 'Vesuvian lights;' and the jury consider the manufacturer is open to censure for entrusting such combustible materials to children of so young an age, and the jury recommend that in future chlorate of potash should be wetted with water, and so rendered non-explosive, before being mixed with the other ingredients of the compound."

Sending Dangerous Materials by Railway.—At the Worship Street Police Office, Mr. Thomas R. Collyer, of Gislingham, in Suffolk, and of Ashley's Hotel, Covent Garden, was charged before Mr. Cooke, at the instance of Mr. William Henry Kent, Superintendent of Police of the Great Eastern Railway, with conveying in a break carriage of the company explosive goods, without distinctly marking their nature on the outside of the package containing them, and without giving proper notice of them to the servants of the company. It was stated that on the arrival of the train at Shoreditch, the box was found to be on fire. The defendant, who was not aware of the legal consequences of his act, under the Railway Clauses Act, a penalty not exceeding £20 for such an offence,—regretted the accident should have occurred, but it was purely an accident, as the whole of the chemicals had been carefully packed in sawdust, but, unfortunately, the stopper of this bottle of nitric acid had not been so securely luted as it should have been, and had come out, and so, gas being generated, it had led to the ignition of the packing and burning of the box, as it then appeared.

Mr. Cooke said, as these proceedings were chiefly intended to act as a warning, and no particular penalty was pressed for against the defendant, who probably thought he was entitled to carry such articles in this way, he should sentence him to pay a penalty of 5*s*. for the offence itself, and 2*s*. for the summons, and a guinea additional for the expenses of the company's solicitor.

In another case, Mr. Henry Joseph, a pipe-maker, Houndsditch, was prosecuted by the London and North-Western Railway Company for having sent by their railway a quantity of combustible goods without indicating that they were of a dangerous character. The charge for the package if marked "dangerous" would have been 42*s*., but by the omission of this precaution it was charged only 2*s*. 6*d*. At one of the receiving-houses a strong smell of phosphorus having attracted attention, the package was opened, and found to contain a quantity of articles labelled "Blazing Fuzees." The defendant was fined £20 and costs.

Poisoning by Tobacco.—A young man, named Richard Edmondson, a cotton-piecer at Messrs. Garnett and Horsfall's, Low Moor, near Clitheroe, died somewhat suddenly, with all the symptoms of having been poisoned. His pulse was quick and feeble, his eyes dilated and insensible to light; the heart was perfectly paralysed, his muscles rigid, and he was unable to swallow. This was his condition before death. The coroner ordered a *post mortem* examination of the body to be made by Dr. Scott, of Clitheroe. He found the vessels of the brain swollen and filled with black blood, together with extravasation of blood in the ventricles of the brain. "These appearances," he deposed, "led me to conclude that the deceased had taken some narcotic poison, as we find them in persons having taken opium. I attribute the appearance of the blood-vessels on the brain to narcotic poison. The deceased was very much emaciated. After hearing all the evidence, I attribute the cause of his death to the chewing of Limerick roll tobacco and his having swallowed the juice. It is a poison that acts on the brain. It is not used in medicine now. I should not like to give a person 30 grains of the unprepared tobacco. Tobacco gains power according to the way in which it is manufactured, and the Limerick roll is exceedingly strong tobacco." The coroner summed up, and the jury returned a verdict "That the deceased died from the effect of having chewed Limerick roll tobacco and swallowing the juice thereof, which has acted upon the stomach as a narcotic poison."

Poisoning by Epsom Salts.—A singular case came before Mr. Humphreys, coroner, on Tuesday evening, September 27th, at an inquest held on view of the body of a carman named Thomas Crooks, aged 53 years. Elizabeth Crooks, 23, Radnor Street, St. Luke's, said,—Last Tuesday, the deceased, being ill, got some medicine from Dr. Bletchley. After taking it he got into a state of great suffering; his stomach swelled enormously. He exclaimed, "I am poisoned. The doctor's medicine has poisoned me." He died soon afterwards. Mr. F. J. Gant, pathological anatomist to the Royal Free Hospital, said that the deceased died from inflammation of the small intestines, caused by an excessive quantity of Epsom salts. He had actually taken a quarter of a pound of Epsom salts before he sent to Dr. Bletchley for medicine, and the enormous quantity had poisoned him. It generated a gas in the stomach which caused the swelling which he attributed to the doctor's medicine. Deceased's wife, recalled, admitted that he had taken a quarter of a pound of salts after a drinking-bout, but she said she knew that the quantity could have done no harm, for he had often before taken 32 doses at one draught, and he was a man that could stand a great deal. Mr. Scott, solicitor for Dr. Bletchley, said that he was prepared to prove that the medicine furnished by that gentleman was not poisonous in its character. The coroner said that evidence upon that point was quite unnecessary after the testimony of Mr. Gant and the admission of the widow of the deceased. The jury concurred with the learned coroner, and returned a verdict "That the deceased was poisoned by an excessive quantity of Epsom salts taken medicinally, and not for the purpose of destroying life."

Death from Drinking Naphtha.—On Monday, September 12th, Mr. Richards, deputy coroner, held an inquest touching the death of Samuel Neal, aged 28 years. J. Neal, brother of the deceased, said that last Saturday evening his brother returned home to No. 4, North Street, Whitechapel. He was very ill, and he expired the next morning. He was an assistant to a wholesale druggist, and had been addicted to drink for the last eight years. Dr. Lewellyn said that he had made a *post-mortem* examination of the deceased. The lungs were congested, and the coats of the stomach were inflamed from drinking spirits of naphtha. The deceased had evidently been in the habit of satisfying his craving for drink by diluting the spirits of naphtha and spirits of wine, and drinking them. He had expired from the effects of taking an overdose of spirits of naphtha. A verdict in accordance with the medical evidence was returned by the jury.

Suicides by Prussic Acid.—An inquest was held on Wednesday, September 7th, at the Battersea Union, on the body of Mr. Edward Villiers Crotty, aged 50 years, who was at one time possessed of a large fortune, all of which however he had lost on the turf. From the evidence of his wife, it appeared that his reduced circumstances had affected his mind. The deceased was found lying on the grass in Battersea Park; death took place a few minutes after he was discovered. A bottle labelled "poison" was found in his pocket. Dr. W. Pocock stated that the deceased died from the effects of prussic acid, and that the bottle found had contained that poison. The coroner having summed up, the jury returned a verdict of "Suicide while in a state of temporary mental derangement."

On Thursday, September 8th, an inquest was held in the Infirmary, Newcastle-on-Tyne, on the body of Mr. William K. Murray, brother of Sir Patrick Keith Murray, of Ochtertyre, Perthshire. Deceased had formerly been an officer in the 60th Rifles, but had left the regiment. He had come to Newcastle for a course of instruction in Messrs. Palmer's works, at Jarrow. On Tuesday, about midnight, he entered the billiard-rooms of the Central Exchange, which he was in the habit of frequenting. After being there some short time he was supplied with a glass of gin, and shortly after he was seen putting some liquid into it. As soon as he swallowed it he suddenly collapsed, and sank with his head on one side. A medical gentleman who was present attended to him, and while the deceased was sitting in a chair in this condition a small glass bottle was taken out of his pocket. The bottle was empty, but it had a disagreeable smell. He was subsequently taken to the Infirmary, where he shortly afterwards died,—in the opinion of the medical men from the effects of swallowing prussic acid. Mr. Murray had been in the habit of taking laudanum in considerable quantities. The jury returned a verdict "that the deceased had died in consequence of taking a quantity of prussic acid, administered by himself, and that there was no evidence to show the state of mind he was in when he took it."

Alleged Poisoning by Cyanide of Potassium.—On Friday, August 26th, two women, named Frances Beckenham and Mary Ann Gribbin, were found dead under the following circumstances. The deceased were sisters, and the former lived with her husband at 21, Albert Cottages, Mile-End New Town; the latter was a widow, and lived in the same neighbourhood. The evidence proved that both women were much addicted to drinking, and that the husband of Beckenham was a poor imbecile creature completely under their control. On the night in question the two women were found dead in the sitting-room, and the man Beckenham crouched under a bed in an adjoining room. The room was in disorder, and there were indications of a recent drinking-bout. A *post-mortem* examination made by Dr. Gayton afforded no clue to the cause of death in either case, but in consequence of a suspicion that death had resulted from poison, the contents of the stomachs with parts of the liver and intestines were submitted to Dr. Letheby for analysis. The principal witness examined was an old woman named Lydia Goozee, who said she was asked by Beckenham to go and see them on the Tuesday; that she found Gribbin complaining of pain and retching violently. Twice during the day Goozee went out and brought them porter and gin, and on the same night Beckenham went to a public house and took home half a gallon of beer. Dr. Letheby deposed that he had examined the contents of the stomachs of the deceased women. The mucous coat of that of the woman Beckenham was very much softened, and the stomach was stained by a purple colour. It contained a teaspoonful and a half of thickish fluid, of a deep red colour, which was carefully analysed for poison, but nothing was found beyond a small quantity of potash and sulpho-cyanogen. Portions of the intestines and liver were also examined, but no poison was found. The stomach of the woman Gribbin contained an ounce and a half of red liquid. The mucous coat was much softened, of a red colour, with a purple stain at one end. There was no trace of food in the stomach. The liquid in it had no peculiar odour, but on being tested for poison it was found to contain about forty grains of carbonate of potash and a little sulpho-cyanogen. The intestines and liver did not furnish any evidence of poison. The result of the analysis was that potash was present in both of the stomachs to a large extent. It existed as carbonate of potash, and might have been taken either in the form of caustic potash, or carbonate of potash, or cyanide of potassium. His opinion was, from the presence of sulpho-cyanogen, that cyanide of potassium was the drug taken. It was a deadly poison, its active principle being prussic acid, and the forty grains found in the stomach of the woman Gribbin would represent about three grains and a tenth of the cyanide of potassium, the commercial cyanide, as compared with that sold by druggists, being an impure preparation, containing only about twenty per cent. of cyanide. That quantity would be quite sufficient to cause death. The not finding prussic acid was accounted for by the decomposition of the body, which has a tendency to destroy prussic acid. All the appearances were those of poisoning by cyanide of potassium, and he believed that to have been the cause of death in both cases. It was used generally by photographers. The coroner, in summing up, observed that looking at the medical evidence, to the effect that there was no organ sufficiently diseased to account for death, and that the deaths had all the appearance of being due to cyanide of potassium, it was for the jury to say whether it was the cause of death. If they were of that opinion, it would be for them to consider under what circumstances it was taken. The evidence on that point was very meagre. The jury returned a unanimous verdict that the deceased women, Frances Beckenham and Mary Ann Gribbin, died from the effects of poison, but under what circumstances it was administered there was no evidence to show.

A CASE FOR THE BENEVOLENT.

We beg to draw the attention of our readers to the case of William John A. Bentley, whose father was a pharmaceutical chemist, and who had been a Member of the Pharmaceutical Society from its foundation.

He appears to have been, at one time, in a prosperous way of business; but for many years failing health had overtaken him, and with this failing health a decline in his business. He died in June last, leaving four children quite unprovided for.

Some friends, sympathizing with the orphans, are endeavouring to obtain admission for one of them, the subject of this notice, to the *British Orphan Asylum*, and we appeal to all our brethren who have any interest in that institution to give their support at the election which takes place next month.

The case will strongly recommend itself to the sympathy of our Members, from the fact that the father of the candidate, although for many years possessed of the scantiest means, never failed in the payment of his annual subscription to the Society; and as a result of this, his orphans will feel the advantage of the "Benevolent Fund" to the extent the existing rules and the Fund will admit.

This affords another proof of the value and importance of that Fund, which has been so warmly advocated in this Journal.

BOOKS RECEIVED.

A MANUAL OF MATERIA MEDICA AND THERAPEUTICS; INCLUDING THE PREPARATIONS OF THE BRITISH PHARMACOPŒIA, AND MANY OTHER APPROVED MEDICINES. By J. FORBES ROYLE, M.D., F.R.S., and FREDERICK W. HEADLAND, M.D., B.A., F.L.S. Fourth edition. London: John Churchill and Sons, New Burlington Street. 1865. (From the Publishers.)

A TREATISE ON SMOKY CHIMNEYS, THEIR CURE AND PREVENTION. By FREDERICK EDWARDS, jun. London: Robert Hardwicke, 192, Piccadilly.

A MANUAL OF CHEMICAL ANALYSIS, QUALITATIVE AND QUANTITATIVE. For the Use of Students. Part II., QUANTITATIVE. By HENRY M. NOAD, Ph.D., F.R.S., etc. London: Lovell Reeve and Co., 5, Henrietta Street, Covent Garden. 8vo. Pp. 663. 1864.

DE L'ALIMENTATION DES ENFANTS. Mémoire de M[me] BAINES, à Londres. Imprimé dans les Annales de l'Association Internationale pour le progrès des Sciences Sociales, congrès de Gand. Londres: L. Booth, 307, Regent Street.

TO CORRESPONDENTS.

Hyoscyamus (Brighton).—Hooper's 'Physician's Vade Mecum,' by Drs. Guy and Harley.

Student (Liverpool) and others.—Pereira's 'Manual of Materia Medica and Therapeutics,' by Farre, Bentley, and Warington, will shortly appear. The price will be about 15*s*.

Herbarium (Norwich).—Bentley's 'Manual of Botany,' price 12*s*. 6*d*., and Fownes's 'Manual of Chemistry,' price 12*s*. 6*d*.

G. H. Dunmore (Penarth, South Wales).—The remedy has been extensively tried in the hospitals in this country and abroad, and is generally regarded as valueless. See a Paper by Professor Bentley, in the 'Pharmaceutical Journal,' vol. iv. N.S. p. 294.

A. Z. (Penzance).—The plant alluded to has a popular reputation in certain districts as a purgative and emetic, but its medical properties are not mentioned in any standard work on Medical Botany.

Aqua Fontana (Leeds).—The seeds are only occasionally met with in this country. The only way of obtaining them is to apply to your wholesale druggist. There is no formula for an extract, and hence we cannot give the dose.

Vinegar without Acetic Acid!—A correspondent informs us that a placard to the following effect may be observed at the door of an oil-shop in the New North Road, Islington: "Strong Pickling Vinegar, 3*d*. per pint—warranted not to contain any Acetic Acid."

"*Semper Idem*" (Manchester).—1. In the Mixture referred to, the Ammonia enters into combination with the Iodine, and thus deprives the solution of colour. 2. Yes,—by the diligent use of the opportunities afforded for study.

R. D. (London).—Smee's 'Elements of Electro-Metallurgy,' or Ure's 'Dictionary of Arts, Manufactures,' etc.

H. W.—Fownes's 'Manual of Chemistry.'

S. W. (Burslem).—Hoblyn's 'Dictionary of Terms used in Medicine and the Collateral Sciences' (Whittaker and Co.).

R. L. (Merthyr).—"Chlorodyne" is a proprietary article, the formula for which we are unable to give.

"*Ponto*" (Liverpool) is referred to the Secretary, 17, Bloomsbury Square, for the required information.

Chemicus Juvenis (Villa Faustina).—A cement made with Isinglass and Glacial Acetic Acid would probably answer the purpose best.

Mr. H. Barnaby (Rochester), *Mr. Howden* (London), are thanked for their communications.

A. B.—We believe there is no other edition of the 'Pharmaceutical Latin Grammar' than that of 1845.

Pilula (Coventry).—The article would be liable to the Stamp Duty; the fact of the recommendation having been issued separately from the article to which it refers, does not alter the case.

The Plates, in illustration of the paper by Messrs. Deane and Brady, "On Microscopic Research in relation to Pharmacy," will be given in the January number.

ERRATA.—Page 196, *for* Noakes, Henry Thorby, *read* Noakes, Edward Thorby; *for* Bailey, John, *read* Baily, John. Page 197, *for* Gibbans, Thomas Gilks, *read* Gibbons, Thomas Gilks.

Instructions from Members and Associates respecting the transmission of the Journal before the 25th of the month, to ELIAS BREMRIDGE, Secretary, 17, Bloomsbury Square, W.C.

Advertisements (not later than the 23rd) to Messrs. CHURCHILL, New Burlington Street. Other communications to the Editors, 17, Bloomsbury Square.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VI.—No. VII.—JANUARY 1st, 1865.

THE PROPOSED LEGISLATION AFFECTING PHARMACY.

We may be excused for once more returning to a subject which at this moment occupies so prominent a place in the minds of the chemists and druggists of this country, and we are encouraged to do so by the very favourable result of the appeal that is now being made to the members of the trade in support of the proposed new Pharmacy Bill of the Pharmaceutical Society. England stands almost alone among the nations of Europe in her previous disregard of the educational qualification of dispensers of medicine; principally perhaps, but not wholly, because the spirit of free-trade, or rather *free-trading*, has long been established here as a fundamental principle. None can deny that the absence of restriction and surveillance has been one great cause of the present glory and prosperity of British trade and commerce. Since the early days of the "*City Companies*," or "Guilds" as they were originally called (save in so far as it was necessary for fiscal purposes) there has been no interference with, or protection to traders in general. Each craft in the beginning, and each individual as crafts enlarged, had to stand on an individual basis, and the wholesome effect of competition best stimulated men to that degree of excellence which is essential to success in trade.

But individual independence should not be allowed to interfere with public safety, and we need scarcely enumerate the instances in which a prohibition is exercised where the *moral health* of the State is likely to be endangered.

Physical health too has had its share of legislative care. "*Cunning men*," "*Herbalists*," and "*Barber-surgeons*" have given place to the physicians, apothecaries, and surgeons of the present day; not perhaps so much by positive prohibitory laws as by negative ones, or more still by the advance of civilization and knowledge. The medical advisers of that day were doubtless as far ahead of their fellow-citizens as the Colleges are at this day. Society advances, and perfection is ever before us. When the Goldsmiths of Lombard Street sufficed for the monetary transactions of London, the Worshipful Company of "*Pepperers*" had charge of the quality of drugs imported into England, and there were few separate venders of drugs. *Selling* medicines was not a trade; the man who sold also prescribed, and hence the Apothecaries Act of 1815. Since that time progress has been even more rapid, and we can imagine the offended dignity of an L.S.A. of 1865, if called on to dispense a physician's prescription for an unknown customer, much more to sell over his counter twopennyworth of jalap, unless indeed he be one keeping an open chemist's shop.

An apothecary is now a "general practitioner," and as has been stated in this

Journal again and again, he has cast off the true duties pertaining to his original title; they have devolved by the mere progression of the division of labour on dispensing chemists, who have now as much need of an educational training for their occupation as had the apothecaries of fifty years ago. Between 1815 and 1865, so rapid has been the advance of science, that it may be almost said to equal the vast distance between old Quincy and Jonathan Pereira! Of the responsibility thrown on dispensers by modern changes they can best appreciate the weight; they know well the anxiety which besets them day by day lest their *employés* should overlook an accidentally excessive dose; so potent are the remedies now in use that the fractional part of a grain of some of them may carry death instead of health to an unfortunate invalid. And again, so much is the knowledge of the power of the modern virulent poisons now popularized, that the mere retailing of drugs becomes every day a more dangerous occupation—an occupation requiring full knowledge of their power and proper purposes on the part of the seller, and a vast amount of clear judgment and discrimination lest he should be imposed on by persons desiring to obtain them for criminal or suicidal purposes.

That chemists generally are now alive to these things is proved by their willingness, and almost anxiety, to be placed under legal compulsion as to educational qualification, as the apothecaries were in 1815. We have ample opportunity of measuring this feeling by the returns sent up by the Local Secretaries of the Pharmaceutical Society in approval of the proposed Bill for the regulation of chemists and druggists; those returns are signed not merely by Pharmaceutical Chemists, who, being on safe ground themselves, might be regarded as prejudiced witnesses, but also by men entirely unconnected with the Society. Looking through such returns as have come in, and the reports of some meetings which have been held to discuss the subject, we see striking instances of this; thus at Canterbury every chemist in the place has signed in favour of the Bill; at Leicester all signed but one, the paper having 43 signatures; at Brighton 45 dispensing chemists have signed out of 52, and besides these, 31 assistants have also signed, and in Manchester 116 names are attached to the memorial, and of that number only 37 are the names of Pharmaceutical Chemists.

That we are on the eve of attaining our long-desired object—the object for which our Society was established and has consistently worked, we have no doubt; and it will be a singular coincidence if that object should be attained exactly half a century after the Apothecaries Act, which may be called its prototype.

Let this then cheer us on our work; let there be no disunion, and success is certain. There is no injustice or oppression, nay, there is even positive protection for chemists and druggists already in business. The Apothecaries Act left men then in practice "as they were;" our Bill proposes to advance the interest of the present race at once by registration; and all would alike benefit by the enactment that in future no ignorant persons should step in to nibble at the loaf, which is none too large for those who must and ought to be fed from it. We have this advantage, that the voice of the public is with us, and especially the voice of the medical profession.

THE BENEVOLENT FUND.

The Council have determined to make a vigorous effort on behalf of the Benevolent Fund. In another part of this month's issue wlll be found the revised regulations. These have been carefully considered by a Special Committee on the subject, and are so framed as to afford a wide scope to the administration of relief, and to place the power of electing annuitants in the hands of Members, Associates, and subscribers.

The Council have determined also upon an important step in attempting to provide for the orphan children of deceased Members and Associates. In the December number of this Journal, the candidature of W. Bentley was commended to the notice of subscribers to the British Orphan Asylum. The Council are of opinion that in cases like this, when the father has been long connected with this Society, and dies in impoverished circumstances, the Benevolent Fund will be well applied (under certain conditions) in endeavouring to secure a home for at least one of his children in some asylum for orphans.

We believe that the determination they have arrived at, and the revised rules under which it is now proposed to give annuities to the needy and afflicted, will meet with the unanimous approval of our readers.

But mere approval will not alone suffice. The Council ask all who are interested in the Society to come forward with a helping hand. It is a dictum accepted among our household words, that "the good men do lives after them." He must be unobservant indeed who fails to recognize its truth. In so far as benevolent institutions are concerned, they who run may read, when they look on those now flourishing among us; some founded by men long since departed, some by those who laboured in our own day. Hospitals and dispensaries abound. Special charities for the blind, the deaf, the crippled, and the incurable, meet our eye. Almshouses innumerable shelter their humble inmates. Asylums for the widow, the fatherless, and the imbecile, give their fostering care to those who are unable to help themselves. Foundation schools are thronged with pupils. In short, London and our other great towns are abundantly able to attest that the large hearts and liberal hands of Richard Whittington and Jenken Carpenter have had their representatives in each succeeding generation.

Among the more remarkable, however, of the modern developments of the spirit of philanthropy, is the noticeable fact that the members of the several trades and professions (to a greater extent probably than at any previous period) have shown a readiness to organize assistance for the destitute of their respective callings. We wish emphatically to urge this fact upon every chemist and druggist in Great Britain. To those who are *not* Members or Associates of our Society we would especially point out, that if the projected Pharmacy Bill becomes law our Benevolent Fund will be open to any chemist then in business whose circumstances may require it.

For the enrichment of the Fund we appeal to all, whether members or nonmembers, to put aside minor differences, and recollect that—

> "We do pray for mercy
> And that same prayer doth teach us all to render
> The deeds of mercy."

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *December 7th*, 1864,

Present—Messrs. Bird, Bottle, Deane, George Edwards, Hanbury, Hills, Morson, Orridge, Sandford, Savage, Squire, and Watts.

The following were elected

MEMBERS.

Hodder, Alfred	Clifton.
Willsher, Stephen Henry	Tenterden.

EXAMINATION, *December 21st*, 1864.

MAJOR (Registered as Pharmaceutical Chemists).

Barton, Henry	Newark.
Rastrick, Robert Joseph	Southsea.
Sells, Robert James	Canterbury.
Shaw, Benjamin	Wakefield.

MINOR (Registered as Assistants).

Cornelius, Richard Bayly	Clapham.
Cox, Samuel Goodhall	Leicester.
Cruse, Thomas Harris	Portsmouth.
Heald, Benjamin	Sleaford.
Heale, William	Bideford.
Matthews, John Hitchcock	Reading.

REGISTERED APPRENTICES.

Name.	Residing with	Address.
Adams, Francis	Mr. Adams	Stoke-upon-Trent.
Allkins, Thomas Boulton	Mr. Ruffe	Tamworth.
Anderson, Howard Gibson	Mr. Anderson	London.
Bemrose, Joseph	Mr. Young	Liverpool.
Buckett, Alfred Henry	Mr. Hibbert	Neath.
Candy, William Gilbert	Mr. Commans	Bath.
Farthing, Thomas	Mr. Morton	Durham.
Hollier, Edward Robinson	Mr. Hollier	Dudley.
Howlett, Henry John	Mr. Rastrick	Southsea.
Ockley, Frederick	Mr. Hallaway	Carlisle.
Moss, John	Messrs. Hulme and Co.	Oldham.
Richardson, John Howard	Mr. Rastrick	Southsea.
Ross, Lewis Buttle	Mr. Ombler	Driffield.

EXAMINATION IN EDINBURGH, *December 13th*, 1864.

MAJOR (Registered as Pharmaceutical Chemists).

Dobinson, William Lewis	Bishopwearmouth.
King, William	Huddersfield.
Shepperley, George	Nottingham.
Taite, James	Glasgow.
Walker, Joseph	Bootle.

MINOR (Registered as an Assistant).

Williamson, James	Edinburgh.

CLASSICAL.

Laidlaw, William	Mr. John Mackay	Edinburgh.

PHARMACEUTICAL MEETING.

Wednesday, December 7th, 1864.

MR. HILLS, VICE-PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting having been read, the following

DONATIONS TO THE LIBRARY AND MUSEUM

were announced, and the thanks of the meeting given to the respective donors thereof:—

The Chemical News.
The Chemist and Druggist.
The British Journal of Dental Science.
The Dental Review.
The Medical Circular.
The Photographic Journal.
The Educational Times.
The Technologist.
The Veterinarian.
The Journal of the Society of Arts.
The Journal of the Chemical Society.
The Canada Lancet.
Bulletin de la Société Chimique de Paris. From the respective Editors.
Transactions of the Botanical Society of Edinburgh. From the Society.

Specimens of Savanilla Rhatany. Specimens of Peruvian Rhatany. From Mr. Haselden.

Dried Specimens of the Lemon-Grass Plant. From Mr. Septimus Piesse.

The following papers were then read:—

ON THE BOTANICAL ORIGIN OF GAMBOGE.

BY DANIEL HANBURY, F.L.S.

The botanical origin of Gamboge has been long involved in some obscurity, for although the drug was evidently produced by a plant of the genus *Garcinia* it has not until recently been possible, for want of good specimens, to determine the species.

Hermann, a Dutch naturalist of the seventeenth century, who resided in Ceylon, referred the origin of gamboge to two plants, one of which is known to modern botanists as *Garcinia Morella*, the other as *G. Cambogia;* and we have it, on the authority of Mr. Thwaites, Director of the Royal Botanic Garden of Peradenia, that the former is capable of affording a very good form of the drug, but that such is not the case with the latter. It is, however, well known that gamboge is not an export of Ceylon, but that it is a production of Siam, a country which is still nearly unexplored by the botanist. Whether gamboge in Siam was yielded by the same tree as that which affords it in Ceylon, was a question which could only be settled by a careful examination of good botanical specimens.

Some years ago Dr. Christison, of Edinburgh, received from Singapore specimens of a *Garcinia* cultivated there on the estate of Messrs. D'Almeida and Sons, which *Garcinia* had been brought from Siam as the true gamboge-tree. Dr. Christison, whose account appeared in the 'Pharmaceutical Journal' for November, 1850, found this plant to be nearly allied to the *G. elliptica* of Wallich, but to differ from that species in having male flowers *pedicellate*, instead of *sessile*. Desirous of carrying the inquiry a little further, and of attempting to set at rest the question of the origin of gamboge, I recently addressed myself to Messrs. D'Almeida, who promptly replied to my letter, and forwarded a jar containing numerous specimens of the gamboge-tree cultivated on their plantation at Singapore. These specimens I carefully examined, comparing them with published descriptions and figures, as well as with specimens contained in the herbaria of the British Museum, of the Royal Gardens of Kew, and of the Linnean Society, in which investigation I had the valuable assistance of my friend Professor Oliver. The correctness of Dr. Christison's observation respecting the pedicellate flowers was immediately obvious, and it was also evident that the plant, but for this character, bore a strong resemblance to *Garcinia elliptica;* we noticed further that it came equally near to the *G. Morella* of Desrousseaux. Under these circumstances we thought it desirable to obtain the opinion of Mr. Thwaites, who, besides being an excellent botanist, was familiar with various species of *Garcinia* in a living state and especially with *G. Morella*. Mr. Thwaites, after examining specimens of the Singapore gamboge-tree, which we had sent to him in Ceylon, replied that the plant was, in his opinion, a form of *G. Morella*, scarcely differing from the Ceylon type, except in having pedicellate instead of sessile flowers. This opinion was completely in accordance with that of Professor Oliver and other botanists whose opinion I had asked, and I therefore felt warranted in bringing the plant before the Linnean Society, in whose 'Transactions' a figure of it has been published, under the following name and synonyms:—

GARCINIA MORELLA, Desrouss., var. *pedicellata*.

G. Morella, Desrousseaux, in Lamarck's Encyclop. Méthod. Botan. iii. 701, pl. 405, fig. 2; Thwaites, Enum. Plant. Zeylan. i. 49.
G. elliptica, Wallich, Catal. no. 4869.
G. Gutta, Wight, Illustr. of Indian Botany, i. 126, tab. 44 (exclus. synon. Linnæi).
Hebradendron cambogioides, Graham, in Hooker's Companion to Bot. Mag. ii. (1836), 193, tab. 27.

Var. *β. pedicellata;* floribus masculis pedicellatis (pedicelli ad 3 lin. longi).

Messrs. D'Almeida informed me that the number of gamboge-trees cultivated on their plantation is twenty-eight, but that it might have been increased to thousands had any pains been taken to do so. The trees are from thirty-five to fifty feet in height, the largest having a circumference of three feet. They grow very luxuriantly, without any attention, on the slope of a low hillock. Gamboge has at various times been extracted from them, but rather, it would seem, as an object of curiosity than for the purposes of commerce.

Professor BENTLEY said that the subject of the paper just read was scarcely of a nature to admit of much discussion in that room; he would therefore only remark that, in his opinion, Mr. Hanbury had now put the last link in the chain of evidence necessary to prove the botanical source of our commercial gamboge. Commercial gamboge, as was well known, was derived from Siam; it did not differ in any marked particulars from the gamboge of Ceylon, and the botanical source of the two kinds had now been satisfactorily traced to varieties of the same species of *Garcinia*.

ON SOME OF THE EXTRACTS OF THE BRITISH PHARMACOPŒIA PREPARED FROM THE DRY MATERIAL.

(*Continued from page* 309.)

BY A. F. HASELDEN.

III.—*Extractum Krameriæ.*

In pursuing my remarks upon some of the Pharmacopœia extracts prepared from the dry material, I have selected that of Rhatany as the first for consideration this evening, under the impression that there are some observations in connection with it which may prove a source of interest. To the followers of the London and Dublin Pharmacopœias the extract of rhatany is a new preparation, this is one feature which makes it worthy of notice; and there is another which is especially interesting,—I allude to the scarcity for some time past of the Peruvian, or Payta rhatany in the London market; indeed, about a year or more ago it was scarcely to be obtained, and yet, with three preparations in the Pharmacopœia—namely, the infusion of London, the extract of Edinburgh, and the tincture of Dublin—the *Krameria triandra*, or Peruvian rhatany, is the only species recognised in the British Pharmacopœia. Now there is, and has been for some seven or eight years past, another kind of rhatany in the market, known as Savanilla rhatany; and with the probability or possibility of a scarcity of Peruvian, it may be worth while to compare the preparations of the two varieties. But before proceeding to that part of the subject, I should like to say a word upon the sources of the two roots. The Peruvian, or old kind, is found in Peru and Bolivia, and exported from Lima to the European ports. The Savanilla is found in New Granada, and exported from the port of Savanilla, and probably takes its name from that circumstance. Savanilla, as may be seen upon the map, is situated in the north of New Granada, at the mouth of one of the branches of the river Magdalena, which flows into the Caribbean Sea. The two roots are from different species; the second, not being produced by the action of climate and soil upon the original kind. Upon careful examination they can be readily distinguished; externally, the stems of the Savanilla are smoother and not so knotty as the Peruvian, the adhesion of the bark to the wood is stronger in the Savanilla than in the Peruvian, and it can be broken without disturbing the bark so much; the colour is also different. For a more detailed account I must refer you to an article in the Pharmaceutical Journal, by Dr. Schuchardt, vol. xvi. pp. 29, 132. The short specimens are such as are commonly found of the Peruvian and Savanilla; the long one, measuring twenty-two inches, is also the Peruvian kind, and such as I should always like to have. From the length and undisturbed state of the bark it is evident that it has been taken up and packed with great care; it is a sample of some recently imported and presented to me by Messrs. Horner. But to turn to the points more especially belonging to my subject. Is the Pharmacopœia process for obtaining the extract an efficient one? and is Savanilla equal to Peruvian rhatany? and would it fill its place in case of a deficient supply?

I believe that I shall be able to establish the facts that the Pharmacopœia process is a satisfactory one, and that there is little or no difference in the value of the two roots. I have here an extract of each kind, prepared according to the Pharmacopœia directions, viz. percolation with cold water and subsequent evaporation by a water-bath heat. From two pounds of coarsely-ground Peruvian rhatany, using four gallons and a half of distilled water, I obtained three ounces and a half of dry extract possessing considerable astringency, and from the marc afterwards digested with boiling distilled water 180 grains of an almost tasteless extract; from two pounds of Savanilla under the same conditions, in the first place, four ounces and a half of dry extract equally astringent, and by subsequent boiling of the marc 480 grains of an equally tasteless extract. It is clear, then, that in this experiment I obtained one ounce more useful extract from the Savanilla than the Peruvian, passing over the inert productions. I may mention that the Pharmacopœia directs the aqueous solutions to be evaporated to a proper consistence. As this extract, like that of logwood, is an exception to the general condition of extracts, it might have been as well to have written evaporate to dryness, as that is the condition in which these two extracts are usually found in commerce; unless the extract of rhatany be evaporated to dryness it is likely to become mouldy. These extracts are soluble in cold water in pretty much the same proportion as it took water to extract them originally, namely, sixty grains in a pint, leaving only a small portion undissolved; they are also dissolved by rectified spirit.

In order to satisfy myself more fully as to the relative amount of extractive obtained from the two, I prepared a pint of tincture from each, using the same proportions and subjecting them in every way to the same treatment. The specific gravity of the tincture prepared from the Peruvian was ·932, that from the Savanilla ·933; a fluid ounce of the former evaporated to dryness by water-bath gave fourteen grains of extract, while the same quantity of the latter yielded fifteen grains of dry extract; the difference is small, but still it evidences in favour of the Savanilla. To the casual observer the two tinctures might pass for one and the same; but if observed carefully, the red of the Peruvian appears rather the deeper of the two. The proof spirit in the tinctures extracted nearly twice the amount of soluble matter that the water did; that is due to the fact that the spirit took up more of the colouring matter than the water. It yet remains, I think, to be proved that either contains more than the other of the astringent principle upon which its virtue as a remedy depends; but from the taste of the extract and tincture, and all the other circumstances, I can only come to the conclusion that the Savanilla is quite equal to the Peruvian, and might in case of scarcity very well supply its place. Therefore I also feel that it would have been well if both kinds had been indicated in the Materia Medica of the British Pharmacopœia, the same compliment being paid them as the catechus; and I may, I think, safely add that my experiments point to the efficiency of the Pharmacopœia process.

There is only one more circumstance which may perhaps be worth mentioning,—I allude to the possibility of the rhatany extract being contaminated with the cheaper one of logwood. The bichromate of potash might here prove serviceable as a detective; but I simply mention this as a hint, it not forming any portion of my object in the present remarks.

IV.—*Extractum Lupuli.*

There is, I believe, sufficient in the extract of hop to make it worthy of being brought before your notice, under the impression that every one cannot have had the opportunity of making all the extracts of the British Pharmacopœia. The Colleges of London and Edinburgh ordered this extract to be prepared by boiling the dried catkins with distilled water, expressing and evaporating, etc. The Dublin did not recognise the preparation at all; and, I believe, although frequently prescribed, it has not generally been looked upon as a reliable one. In the British Pharmacopœia the manner of preparing it has been changed, and apparently with advantage. I must, at the risk of being tedious, read over the form, in order to make myself quite intelligible.

"Take of hop one pound, rectified spirit one pint and a half, distilled water one gallon. Macerate the hop in the spirit for seven days, press out the tincture, filter and distil off the spirit, leaving a soft extract. Boil the residual hop with the water for one hour, then express the liquor, strain and evaporate by a water-bath to the consistence of a soft extract, mix the two extracts, and evaporate at a temperature not exceeding 140° to a proper consistence."

It will at once be perceived that the employment of spirit in the first part of the process is an important alteration, and I believe I shall be able to show an equally great improvement. At first sight it would seem that with so bulky a thing as hop the quantity of spirit would not be at all in proportion, but, however, in practice it will be found that although the scales do not get soaked, yet their surfaces are wetted with, and acted upon by the spirit. After maceration for seven days I obtained, by strong pressure, twenty fluid ounces, from thirty of spirit used, of a very strong dark olive-green tincture, possessing great bitterness and a very powerful aromatic odour peculiar to itself. Two fluid drachms of this tincture gave, by evaporation over a water-bath, ten grains of a soft greenish resinous extract interspersed with streaks of a dark yellow, having an oily appearance; from a similar quantity, upon the addition of distilled water, a precipitate was obtained, which, collected and dried, weighed five grains.

From the twenty fluid ounces of tincture I recovered by distillation sixteen ounces of spirit, having a strong odour of the hop, as you may notice from the spirit before you; but not having in solution sufficient oil to produce turbidity when mixed with water, upon evaporating the contents of the retort (and I may here remark that the spirit should not be drawn off too closely) I obtained one ounce and a half of the soft extract before mentioned; having boiled the residual hop as directed, I got, by expression and evaporation, two ounces and a half of soft extract, having a bitter taste but little or no aroma. The two extracts when mixed gave by weight four ounces of an extract not so stiff as extracts are commonly made, but possessing, as you may clearly see by sample, a very fine aromatic odour and bitter taste most unmistakably peculiar to hop; more extract might have been obtained by a second boiling of the hop, but it would have been valueless. By this process I have obtained twenty-five per cent. of extract, by the old process the product was nearer thirty per cent.; by comparing the two extracts a marked difference will be observed. I have but little to add, except that I consider this mode of preparing the extract infinitely superior to the old; that if it be of any value as a calmative or hypnotic, it has now a fair chance of proving itself worthy of attention. I would throw out as a suggestion, that more spirit might be used with advantage; that the present extract will cost more than double the old, must also be clear to every one; but, as I have said upon former occasions, where so precious a thing as health is concerned, the cost of a good preparation, if within reason, should never be a bar to its production or employment.

Professor Bentley said that the investigations of Mr. Haselden led to the same results as his own, for he had for some years past stated in his lectures on Materia Medica, delivered at the Pharmaceutical Society, that there was no material difference in Peruvian and Savanilla Rhatanies, but, upon the whole, the latter was to be preferred. In his lecture "On the Organic Materia Medica of the British Pharmacopœia," which was published in the Pharmaceutical Journal last April, he had also remarked that, as the officinal or Peruvian Rhatany possessed no advantages over Savanilla Rhatany, there was no satisfactory reason why the latter should not have been also made officinal in the British Pharmacopœia.

Mr. Daniel Hanbury stated that Professor Guibourt had shown some years since, when Savanilla Rhatany was first introduced into commerce, that it was superior to Peruvian Rhatany. Mr. Hanbury's experience was to the same effect, and in the house with which he was connected they used the two kinds indifferently in making preparations of this drug.

The Chairman, in thanking the author for his valuable practical communication, referred especially to the subject of extract of hops, and said he thought it was worthy of consideration whether this extract would not be improved in quality if it were made from hops that had not been exposed to the fumes of sulphur. It was well known that hopgrowers were in the habit of exposing the hops after drying them to these fumes, and the practice was so common that no hops could be purchased that had not been thus treated, but he (the Chairman) believed the peculiar aroma of the hop was injured by the sulphurous acid. He had often wondered that some of the brewers had not tried the use of hops in their natural state, feeling assured that the result would be the production of a beer of very superior flavour. With reference to the samples of extract that had been produced, he thought there could be no doubt that that made by the process of the new Pharmacopœia was decidedly the best.

Mr. Morson thought it might be satisfactory to the meeting to know that the new process for extract of hops which had been introduced into the British Pharmacopœia originated with one of their own body, namely, Mr. Deane. Referring to the spirit which was recovered by distillation in the process, he observed that it possessed the peculiar flavour of the hop in a high degree, and he thought it might admit of some special application.

Mr. Haselden said it had also occurred to him that probably this spirit might be used for the sake of the flavour it possessed.

Professor Redwood said some attempts had been made by brewers to prevent the loss of the volatile oil of hop, the greater part of which was lost in the process of boiling as now conducted, but such attempts had not, he believed, proved successful. With reference to the remarks made by the Chairman on the subject of sulphuring the hops, it must be borne in mind that this practice was universally adopted by hopgrowers, and had been so from time immemorial, and it was generally found in such cases that there were some good grounds for the adoption of the practice. He was not certain what the object of this process was, but had conjectured that it was to destroy the larvæ of insects which would prove destructive or injurious to the hop. He had discussed the subject with brewers, and had not found that they considered the flavour of the hop to be injured by fumigating them with sulphur in the usual way, although objection was taken to the application of sulphur in the solid state to the growing hop-plant, on the ground of its causing the hops to have a disagreeable flavour.

The Chairman thought the purpose for which the hops were exposed to the fumes of sulphur was that of improving their appearance, and giving them a good colour.

ON NITRITE OF SODA.

BY MR. A. J. ROBERTS.

It is with some diffidence that I bring this paper before the meeting, feeling as I do that there are many present more conversant with the subject than myself; but knowing at the same time that the ranks of the Members must be recruited from those of the Associates, and that it is to them that the Society looks for future support, I am encouraged to proceed, in the hope that in our discussion on the following remarks some facts to the advancement of Pharmaceutical science may be elicited.

There is only one preparation in the Pharmacopœia in which the nitrite of soda is used, viz. spirit of nitrous ether, or, as it is commonly called, sweet spirit of nitre; the object of the compilers of the Pharmacopœia has apparently been to give a process for the preparation of the sweet spirit of nitre which should be at once safe and easy of execution, but in the production of the principal compound (the nitrite of soda) used in its manufacture, there appears to be some difficulty. We are told to take nitrate of soda, and this is defined to be pure, entirely soluble in water and giving no precipitate with either nitrate of silver or chloride of barium, showing absence of mechanical impurities, sulphates, and chlorides. This pure nitrate of soda, quite dry and in fine powder, is to be thoroughly mixed with freshly burned charcoal, also in fine powder; the mixed powders are then to be thrown in successive portions into a clay crucible heated to dull redness, and when the salt has become quite white the heat is to be raised, so as to liquefy it, and it is then to be poured out on a clean flagstone, and when cold broken to pieces and preserved for use in a stoppered bottle.

Thus far the Pharmacopœial directions, and now for my own experience of this process. I operated on one pound of commercial nitrate of soda, and an ounce and a quarter of powdered charcoal, and obtained about twelve ounces of a dirty reddish-brown and very impure salt. The next point was to ascertain the quantity of nitrite it contained, which I did by trying to dissolve a portion in rectified spirit, as the Pharmacopœia tells us it is soluble in that menstruum. On treating a weighed quantity with successive portions of rectified spirit, I found forty-four per cent. were soluble; this I considered favourable, as I was operating on commercial nitrate, which I knew could not be pure.

I then tried what results could be obtained with pure nitrate of soda, so by dissolving the commercial nitrate, filtering and crystallizing the solution, I obtained a beautifully clean and pure salt. I again submitted the same proportions to deflagration, but, contrary to my expectations, the product was coloured, though not so deeply as in the first instance, and the crucible appeared to have been acted on by the fusion of the salt; the result, however, was an improvement on the former one, for it contained sixty-eight per cent. of salt soluble in rectified spirit.

I next tried a thin white kind of crucible, and subsequently one of blacklead, but still the product was coloured; the yield of soluble salt in rectified spirit was between sixty and seventy per cent.

Of two samples I obtained from manufacturing chemists, one contained sixty and the other sixty-six per cent.

I found the salt which was dissolved out by rectified spirit to answer the Pharmacopœial test for nitrite of soda, namely :—

The evolution of nitrous fumes with tartaric acid.

A crystalline precipitate soluble on boiling the liquid with nitrate of silver. And,

An emerald-green coloration with solution of sulphate of copper.

It also required one ounce of rectified spirit to dissolve ten grains of the salt.

It now remained to ascertain if nitrate of soda was soluble in rectified spirit, and, if so, to what extent. I found four grains to be dissolved by a fluid ounce of cold rectified spirit.

So that from this it appears that the solubility of this salt in rectified spirit is no test of its freedom from nitrate. The form of the crystals will not help us, for Gmelin states the nitrate and nitrite have both the same crystalline form. What is required seems to be a good quantitative test, and also a good process of the manufacture of this salt. The intention of the framers of the Pharmacopœia has been excellent, and this is a step in the right direction.

I regret I am unable to bring any more definite results before you, but hope to do so at a future day. Having thus started the subject, I hope some others who may have been labouring in the same field will favour us with their experience.

I have a specimen of the spirit of nitre on the table, prepared from the impure nitrite of soda; its specific gravity is ·840, rather lighter than British Pharmacopœia; it possesses the property of dissolving balsam of copaiba when mixed in equal volumes, which is not the case with the spirit of nitre usually sold. This specimen is quite fresh, but some distilled a few weeks back, though free from acid at first, became strongly acid in the course of four or five days.

The Chairman expressed satisfaction at having to congratulate an Associate of the Society on supplying so practically useful a communication. It was to those who are now Associates that the Society must look for its future support, and he was glad to see their young men coming forward to contribute papers to the meetings.

Professor Redwood said the Pharmacopœia process for the preparation of nitrite of soda was, as he believed he had been the first to notice, quite unequal to the production of the article in a state fit for the purpose to which it was applied. The salt produced by the process was a variable mixture of nitrite, nitrate, and carbonate, together with caustic soda, if much heat be applied. The alcohol test for nitrite was very fallacious, and could not be used for separating this from the undecomposed nitrate, as the latter was soluble in spirit to some extent,—indeed, according to Fischer, as quoted by Storer in his 'Dictionary of Solubilities,' nitrite of soda was even less soluble in alcohol than nitrate. The use of a salt made by the Pharmacopœia process in the preparation of spirit of nitre was objectionable, on account of the uncertainty belonging to it; but if a good and reliable nitrite could be obtained at a suitable cost, the use of such a salt would probably afford the best means of producing nitrous ether. Rather than use the so-called nitrite of the Pharmacopœia, he would prefer to employ the nitrate which could be obtained in a state of purity, and would therefore yield spirit of nitre in a more uniform state than the other. It must be admitted that not only the production, but even the composition of the nitrites was involved in some doubt. They appeared, in their decomposition with acids, to give off NO_2 rather than NO_3. The Pharmacopœia process for spirit of nitre was founded upon the assumption that nitrite of soda would yield NO_3, and produce pure nitrous ether in solution in spirit. Even if it did this, it remained to be proved that a pure solution of nitrous ether was equivalent to the old "sweet spirit of nitre." He thought they should be cautious in such a case how they were led away by the notion of having a pure product. There were many substances used in medicine, in the arts, and as articles of diet, which owed their excellence to what some might call their impurities, that is, to the presence of bodies that could not be clearly defined. They were not simple, definable bodies, but still they had their virtues and excellences. The old "sweet spirit of nitre" he considered to be one of these. It was a complex body in which nitrous ether was only one ingredient, and there were others on which its useful and agreeable qualities might depend. He might refer to another similar preparation in the case of the so-called chloric ether. This was originally produced by a process in which a solution of chloroform with other allied bodies was produced, and that preparation obtained considerable repute. It was miscible with water without any separation. But then the real nature of its composition was not known, excepting that it consisted principally of a solution of chloroform, and accordingly a process was adopted for its preparation by merely dissolving chloroform in spirit of wine. He had no hesitation in saying that this product was greatly inferior to the original. He could easily, if necessary, quote other instances of a similar description, and he doubted whether mere solution of nitrous ether in spirit would form the best sweet spirit of nitre.

The Chairman asked if the old Edinburgh process for spirit of nitre was not the best?

Professor Redwood said if the object was to get *sweet* spirit of nitre, he believed the old London process was the best.

Dr. Attfield thought it important that the composition of medicines should be clearly defined, and although a pure solution of nitrous ether may not be entitled to the name of sweet spirit of nitre so much as the old preparation, he thought at least that its effects should be fairly tried, and therefore that they should continue to seek an efficient means of producing it. The process of the British Pharmacopœia for the production of nitrite of soda had certainly failed, but he thought it was still worth while to try whether some other means of reducing the nitrate could not be devised. It would be well to try carbon in different states and at different temperatures. He had found that wood charcoal would decompose nitrate of soda at a temperature below that at which deflagration occurred. In operating on organic bodies it was found that particular oxidizing agents acted better in one case than another, so that each substance might be said to have a preference for a particular oxidizer, and it might be the same with deoxidizers.

Mr. Roberts wished to express his obligation to Messrs. Fisher and Haselden, in whose establishment he lived, for the opportunities and assistance afforded him in carrying out his experiments.

The Chairman, at the conclusion of the meeting, drew attention to a "percolator" which had been sent for exhibition by Mr. Thomas Kay, of Hillgate, Stockport. He said it appeared to be a simple, cheap, and efficient form of apparatus.

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Fisher and Haselden, 18, Conduit Street	1	1	0
Fletcher, Francis, Cheltenham...	0	5	0
Fletcher, John, 338, Oxford St.	0	5	0
Foott, Richard R., Pimlico	0	10	6
Forrest, Richard, Celbridge Place, Westbourne Grove	0	10	6
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Friend, A, per H. Deane	1	1	0
Gadd, Charles, Vauxhall	0	5	0
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Groves, Thos. B., Weymouth ...	0	10	6
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Haddock, George J., 338, Oxford Street	0	5	0
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Halliday, William J., Manchester	0	10	6
Hamp, John, Wolverhampton ...	1	1	0
Hardy, Samuel C., 338, Oxford Street	0	5	0
Harris, E. R., Brighton............	1	1	0
Harvey and Reynolds, Leeds ...	1	1	0
Herrings and Co., 40, Aldersgate Street	2	2	0
Hickley, Thos. P., 125, Edgeware Road	0	10	6
Hills, Thos. H., 338, Oxford St.	1	1	0
Hodder, Henry, Bristol	0	5	0
Hollier, Elliott, Dudley............	0	10	6
Hooper, Bartlett, 43, King William Street	0	10	6
Horncastle, John, 12, Stanhope Terrace, Hyde Park	0	10	6
Howell, Thomas, Camden Town	0	10	6
Howell, Maurice, Peckham	0	10	6
Hurst, Wm. F. H., Gloucester...	0	5	0
Hurst, John, Louth	0	10	0
Husband, Matthew, Exeter	0	10	0
Hustwick, Thomas H., Hereford	0	5	0
Huxtable, John, 104, John Street Road	1	1	0
Jackson, Thomas, Manchester ...	0	10	6
Jenkins, Joseph, Nottingham ...	0	10	0
Johnson, Benjamin M., 70, Tottenham Court Road	0	5	0
Jones, Henry S., 139, Fulham Rd.	0	5	0
Jones, Humphrey, Llangollen ...	0	5	0
Jones, Ellis P., Rhyl	1	1	0
Kemp, David, Portobello	0	10	0
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Morton, George, Stratford	0	10	6
Mould, Samuel, 21, Moorgate St.	0	10	0
Muskett, James, Harleston	0	5	0
Musson, T. G., Birmingham	0	10	0
Nicholson, Frederick, 216, Paul's Road, Highbury	1	1	0
Nind, George, Wandsworth	0	10	6
Noakes, Richard, Brighton	0	10	6
Orridge, Benjamin B., 30, Bucklersbury	1	1	0
Owles, Edward John, Aldeburgh	0	10	6
Paine, Standen, 338, Oxford Street	0	5	0
Palk, John, Exeter	0	10	0
Palmer, Faithful, Cheltenham	0	5	0
Palmer, Robert, Ovington Square	1	1	0
Palmer, Charles F., Birmingham	0	10	6
Parkes, John C., Woolwich	0	10	6
Parsons, William, Portsmouth	0	10	0
Patterson, George, Stamford	0	10	0
Peat, Walter, Fareham	0	5	0
Pedler, Geo. S., 199, Fleet Street	1	1	0
Peele, Henry A., 338, Oxford St.	0	5	0
Penrose, Arthur W., 7, Amwell Street	0	5	0
Picnot, Charles, Strood	1	1	0
Pocklington, James, Sydenham	0	10	6
Pollock, T., 129, Fenchurch St.	1	1	0
Powell, John, Shaftesbury	0	10	6
Pratt, John, Chichester	0	10	6
Prior, George T., Oxford	0	10	0
Prockter, Richd. E., Cheltenham	0	5	0
Proctor, W., Newcastle-on-Tyne	1	1	0
Randall and Son, Southampton	1	1	0
Rankin, Wm., Kilmarnock	1	1	0
Rastrick, Joseph L., Southsea	0	5	0
Rastrick, John Alfred, Woolwich	0	5	0
Redfern, Jn., Ashby-de-la-Zouch	1	1	0
Roberts, Albinus, St. Alban's	1	0	0
Robertson, James, Edinburgh	1	1	0
Robinson, James M., Beverley	0	5	0

	£	s.	d.
Rogers, Wm., Maidstone	0	5	0
Rogerson, Michael, Bradford, Yorkshire	2	2	0
Rook, Edward, Sittingbourne	0	10	6
Russell, C. J. L., Windsor	0	5	0
Sagar, Henry, Leeds	0	5	0
Saunders, Albert J., 338, Oxford Street	0	5	0
Savage, Wm. D., Brighton	0	10	6
Shaw and Brook, Stockport	1	1	0
Shirley, John G., Bayswater	0	10	6
Skoulding, Wm., Wymondham	0	5	0
Sims, John F., Barnsbury	0	5	0
Sircom, Richard, Bristol	0	5	0
Snape, Edward, Birmingham	0	5	0
Southall, Son, and Dymond, Birmingham	1	1	0
Spearing, James, 338, Oxford St.	0	5	0
Spencer, Charles, Gravesend	1	1	0
Smith, Nathaniel, Cheltenham	0	5	0
Smith, Wm. F., 12, Keen's Row	0	10	6
Squire, Peter, 277, Oxford Street	1	1	0
Starkie, Richard S., 4, Strand	1	1	0
Stathers, John, 43, Norland Road	0	10	6
Stone, John, Exeter	0	5	0
Stott, Wm., Sowerby Bridge	0	5	0
Strawson, Henry, Crewkerne	1	1	0
Street, Edward, Cheltenham	0	5	0
Sutton, Francis, Norwich	1	1	0
Tanner, Nicholas W., Exeter	0	5	0
Thomas, John A., Harrogate	0	5	0
Thomas, James, Bridge	0	5	0
Thomas, Rees, Merthyr Tydfil	0	5	0
Thompson, John, Liverpool	0	5	0
Tomlinson, Chas. K., Lincoln	0	5	0
Tucker, Charles, Bridport	0	10	6
Unney, Chas., 40, Aldersgate St.	0	5	0
Vizer, Edwin B., Lupus Street	1	1	0
Waite, Joseph, Cheltenham	0	5	0
Walsh, Edward, Manchester	0	10	6
Warner, Charles H., Fore Street	1	1	0
White, Daniel, Park Terrace, Regent's Park	1	1	0
Wigg, H. John, 338, Oxford St.	0	5	0
Wilkinson, William, Manchester	0	10	6
Wilson, Thos., Upper Holloway	0	10	6
Windle, Wm., 48, Portman Place	0	10	6
Wright and Francis, 11, Old Fish Street	1	1	0
Young, George, Millwall	0	5	0

Donations.

	£	s.	d.
Battley and Watts, 32, Whitecross Street	10	10	0
Bristow, Robert A.	1	1	0
Flint, W. H.	1	1	0
Ker, Abiah	1	1	0

BENEVOLENT FUND ACCOUNT FOR THE YEAR 1864.

	£	s.	d.	£	s.	d.		£	£	s.	d.
Subscriptions	153	2	0				Grants to two Widows	40			
Donations	13	13	0				„ to two distressed Members with families	55			
				166	15	0	„ to Orphan Children	20			
Dividends				180	13	11			115	0	0
							Purchase of £257 5 6 Consols		232	8	11
				347	8	11			347	8	11

Invested in Consols, 31 Dec., 1863	£6,182	19	10			
Purchase of Consols as above	257	5	6			
				6,440	5	4

REGULATIONS OF THE BENEVOLENT FUND OF THE PHARMACEUTICAL SOCIETY.

Objects.

1. The objects of this fund are:—

To provide pensions for distressed Members or Associates, or the widows of distressed Members or Associates, of this Society.

To afford occasional grants of money to distressed Members or Associates, or their widows or orphan children.

To provide orphan children of Members or Associates (under urgent or distressing circumstances) with a temporary home or with pecuniary aid.

Election of Pensioners.

2. At the first Meeting of the Council after the Annual General Meeting in every year, they will determine as to the expediency (financially) of electing pensioners in the month of October following.

Notice of Election.

3. If the Council deem it discreet to elect pensioners, their decision will be made known by advertisement in four of the London daily papers and in the ensuing issue of the 'Pharmaceutical Journal and Transactions,' stating the number of cases to be elected.

Amount of Pension.

4. The pensions shall not exceed the value of £45 yearly, payable quarterly.

Age of Candidates.

5. Candidates for election must be at least fifty years of age.

Restriction as to Income.

6. No person will be eligible as a candidate for the pension who possesses an income of £30 per annum.

Evidence of Candidates' eligibility.

7. Members and Associates as petitioners for relief from this fund shall produce a certificate of moral character, and such evidence of their age as shall be satisfactory to the Council of the Society; shall state the time and place or places in which they have been engaged in business, whether on their own account or otherwise, how their misfortunes originated and when, their present means of subsistence and from what source it arises, and the number of those (if any) dependent upon them for support.

Evidence of the Widows' eligibility.

8. Widows shall produce evidence of their age, the certificate of marriage, and the certificate of the burial of the husband, or such evidence as shall satisfy the Council on these points; the period during which the husband was in business, and where; the cause of misfortune; the present means of subsistence, and from what source it arises; the number of children (if any) dependent on them for support.

Certificates of four Members or Voters necessary.

9. In all petitions for assistance from this fund, the truth of the statements shall be certified by at least four Members of the Society or subscribers to the fund, two of whom are personally acquainted with the facts of the case.

10. The Council, after due investigation, if satisfied that the case is an eligible one, will decide whether the relief to be afforded shall be temporary or annual, and, if the latter, the case shall be put on the list of approved candidates for election. Council's decision.

11. As soon as the Council have decided upon the case, the petitioner for annual relief will receive written information from the Secretary. No cards or canvassing letters are to be sent to the Members or Associates of the Society, or to the subscribers to the fund, until the applicant has received official notice of the acceptance of the petition by the Council. Canvassing.

12. Pensions will be terminated by the Council in case of misconduct on the part of the recipient, or if the improved circumstances of the pensioner at any time disqualify him or her to receive the benefits of this fund. In the case of Widows, the pension will cease if they marry again. Cessation of Pension.

13. If at any time it shall become evident that the election of any case has been secured by fraud or by false representation, such election shall be forthwith declared void by the Council. Fraud.

14. In case of a candidate being unsuccessful at the first election, credit shall be given for the number of votes at that and the four next succeeding elections, but not beyond that time. Votes to be carried on.

15. At every election of cases, five scrutineers will be elected from the voters present to conduct the election, who shall report to the chairman the number of votes polled for the respective candidates. Scrutineers.

16. The chair at such elections will be taken by the President, Vice-President, or a Member of the Council for the time being. Chairman.

17. The votes will be taken by polling papers (to be delivered in by person or by proxy), which will be sent to every Member and Associate, and to Life and Annual Subscribers entitled to votes under clauses 19, 20, 21, and 22. Voting.

18. The polling papers of Members, Associates, and Subscribers whose payments are in arrear and the privilege of voting will be withheld until the same be duly paid. Votes in arrear.

19. Persons contributing half-a-guinea annually shall have one vote at each election of cases, and persons contributing one guinea annually shall have two votes, the right of voting at such elections being increased in the same proportion by the same rate of contribution. Annual Subscribers.

20. Persons contributing five guineas at one time shall have one vote for life at each election of cases, and persons contributing ten guineas at one time shall have two votes, the right of voting at such elections being increased in the same proportion by the same rate of contribution. Life Subscribers.

21. Firms or corporations contributing five guineas at one time shall have one vote at each election of cases for the period of ten years from the date of such contribution, and firms or corporations contributing ten guineas at one time shall have two votes at each election of cases for the same period, the right of voting at such elections being increased in the same proportion by the same rate of contribution. Votes of Firms, etc.

22. One executor paying a legacy of fifty pounds will have five votes for life at each election of cases, and if it exceed £100, every one of the executors shall have the same privilege. Votes of Executors.

23. The polling-papers and tellers' list shall not be open to the inspection of any person without permission from the Council. Inspection of Papers.

24. Should a scrutiny be demanded or any complaint made in reference of the result of the poll, the same must be submitted to the consideration of the Council at their first subsequent meeting, and their decision shall be final. Scrutiny.

25. Every Member of the Society not in the receipt of nor an applicant for relief out of the Benevolent Fund will be entitled to two Votes of Members and Associates.

votes, and every Associate not in the receipt of nor an applicant for the like relief, to one vote.

Votes from several sources.

26. Every person entitled to vote in more than one class of voters will be entitled to the votes due to him from each of such sources.

Casting Vote.

27. In the event of an equality of votes, the chairman shall have the casting vote.

Rejection of Votes.

28. Should any polling-paper not be properly filled up or signed, the same shall be rejected by the scrutineers on their casting up the votes.

Orphans' Application.

29. Applications on behalf of orphans shall state their age and afford satisfactory evidence of the marriage and burial of the parents, and whether any means of subsistence have been left them, if so, its amount and the source from whence it arises, accompanied by a certificate signed as required by Clause 9.

Home for Orphans by Purchase.

30. In the case of an orphan left under circumstances of urgent distress, the Council may, if they think fit, provide a home by purchase in one of the national asylums for orphans, never exceeding, however, more than one case yearly until larger funds are in their possession.

PHARMACEUTICAL SOCIETY, EDINBURGH.

The first meeting for the present session was held in St. George's Hall, George Street, on Tuesday evening, 22nd November; Mr. D. Kemp, President, in the chair. There was a full attendance.

THE PRESIDENT'S ADDRESS.

Gentlemen,—On taking the chair for the first time, as President of the North British branch of the Pharmaceutical Society, I have to thank you, very cordially, for the honour of being elected to an office which has been held hitherto by some of the most able and most respected members of our profession.

While I am not without doubt as to the propriety of your choice in my case, I desire to assure you that no efforts will be wanting on my part to discharge the duties of the office to the best of my ability, and to promote the interests of the Pharmaceutical Society, which I believe to be identical with the interests not only of Pharmaceutists and of Pharmaceutical Science, but of the public generally.

On commencing the labours of another session, I hope I need only remind you of the importance of attending the meetings as numerously and regularly as possible, because this tends very much to encourage those who address us, and to diffuse more widely the benefits which our scientific papers and discussions are intended and well fitted to impart.

I am glad to say that hitherto this branch of the Society has prospered, and that our meetings have, upon the whole, been highly successful. For this, however, we have been mainly indebted to external aid, to the efficient help we have received from gentlemen, distinguished for their attainments in various departments of knowledge, lovers of science for its own sake, and warm friends of the Society, who have contributed to this success, both by the attraction of their names and the value of their addresses.

At the same time, it is due to the Society that I should acknowledge the valuable assistance we have received from some of our own members, who have on several occasions read excellent papers, on a variety of important and interesting subjects. These efforts, however, although highly appreciated, have not been so numerous or general as it is desirable they should be. It would, I am sure, be a very gratifying sign of progress if we were a little more self-sustaining in this respect.

I am aware that the responsible duties connected with our business require a large portion of our time and attention, and afford very little leisure for extra study, or preparing papers on the subjects and phenomena which sometimes attract our notice. Still it is probable there are some who have occasional opportunities for such exercises, whose habits and tastes tend more in that direction, and who therefore might do much to assist us, and in so doing secure no small benefit to themselves. Indeed, each of us should feel that we are responsible, to some extent, for the success of our meetings; and that we ought, if it be at all possible, to do something to increase their usefulness and keep up their interesting and attractive character.

Since our last session, we have had some additional experience of the British Pharmacopœia, and we are now in a position to judge of it more impartially, and perhaps more favourably, than we did on its first appearance. At that time there was considerable disappointment, on account of the unexpected omission of many useful and familiar preparations; and the apparently unnecessary changes which had been made in others, the only obvious effects of which were to deprive us, to a large extent, of the benefit of knowledge and experience which had cost us years of labour to acquire, and send us back to begin our Pharmacopœial studies once more.

This feeling, I believe, is fast passing away. We are now in some measure reconciled to the change, and alive to the duty of adopting the new formulæ, so far as it is in our power to do so. But, it must not be forgotten that this matter is not entirely in our own hands.

There is one part of the new instructions which it is fortunate we did not adopt, viz. that we "should alter or destroy all pharmaceutic preparations, made according to the previous, and now altered formulæ," for it is evident from the number of old prescriptions, and the aversion to change, on the part of many of the medical profession and the public, that they must have been reproduced at great trouble and expense. Nevertheless, the new preparations are rapidly displacing the old ones, and so soon as there is reason to believe that prescribers desire it, the substitution will become general. It is our desire and our interest that it should be so as speedily as possible, that we may at once enjoy the advantages which the change was intended to secure.

The publication of the British Pharmacopœia, must be regarded as a very important event in the history of pharmacy in Great Britain, as a very decided evidence of progress, and a great triumph over national and professional prejudices. It must have been a task of no ordinary difficulty, to reconcile the conflicting opinions of the various parties engaged in preparing the work. For this, no doubt, concessions had to be made on all sides. But these are hardly to be regretted, if we look to the grand result—a national Pharmacopœia, a uniform standard for the whole of the United Kingdom; which, although far from being perfect, will doubtless be improved from time to time, as new editions are required.

It seems probable, from the reports of Dr. Taylor and the medical officer of the Privy Council, on poisoning, and the dispensing, vending, and keeping of poisons, that there will ere long be another legislative effort to regulate the sale of poisonous substances, to determine the safest mode of keeping them, and who are to be entrusted with the duty of dispensing and vending them to the public. In such circumstances, it is well to know that our interests are safe in the hands of the Council of the Pharmaceutical Society in London, who will not only be among the first to welcome such a measure, but to give every assistance in their power so as to render it practicable and efficient, without unnecessarily hampering or restricting our operations.

This is just one of many benefits which result from our association. It provides us among other things, with an active and intelligent executive, whose duty it is to watch, and if possible guide every movement in the direction indicated, so that it may be thoroughly matured, and carefully adapted to the end in view,—to guard us against crude and ill-digested legislation on such an important subject, and what would really be a great misfortune, its being left in the hands of those who have no special qualification for the task, or practical acquaintance with the requirements of the business and the public.

We have been strikingly and painfully reminded by what has recently occurred in another part of the kingdom, of the immense responsibility which lies on us, both as principals and assistants, in connection with this subject, and of the necessity not only for constant care and watchfulness on our part, but of having all uncertainty as to the kind and degree of our liability in cases of accident removed.

While we readily admit that every means should be taken to prevent mistakes, and to protect the public from their consequences when they do occur, we feel on the other hand that something should be done to protect us from the arbitrary and ruinous penalties which the present state of the law in England at least seems to sanction. If it can be shown by the druggist that proper arrangements have been made, that everything has been done which the most careful forethought could devise, that rules have been laid down, and as far as possible enforced, and that the dispenser is well qualified for his duties,—I think that is all that can reasonably be expected of us, for it is simply impossible that principals can see and know, much less superintend all that is done, even in a limited establishment, and therefore it is very difficult to see the justice of making one individual responsible for the act of another, over which he had no control and could do nothing to prevent.

I believe the public have no idea of the care and anxiety of chemists and druggist generally, not only to prevent dangerous mistakes, but even trifling errors, which at once arouse the suspicion of the patient and the medical attendant, and not infrequently destroy the confidence of both, thereby causing an amount of pecuniary loss, which of itself is a strong guarantee against them.

As an evidence of our solicitude for the safety of the public and the preservation of our professional character, I think we may safely point to our general accuracy, and the beautiful and correct system of labelling which we have devised and spontaneously carried out at great labour and expense, and that too in face of no small opposition from the public themselves, who sometimes manifest considerable impatience even at the brief delay which the operation occasions.

There are many, however, who think that something more should be done, and accordingly we have had a variety of suggestions as to the subject generally, and particularly as to the internal economy of our establishments,—some suggesting improvements in the shape of the shop bottles, and others in the kind and style of the labelling, etc. But while there might not be any harm in making some changes in these respects, I do not anticipate any great benefit from them, because it is only transferring the responsibility from one sense to another, from the sight to the touch, which is just as likely to be put off its guard by familiarity with the object as the other. Supposing the chemist to understand his business, I think the safeguards which experience suggests as the best, are to put dangerous articles as far as possible out of the way, and quite separate from others similar in appearance, but comparatively harmless; to read the label on the bottle carefully, both before and after removing, the quantity of its contents required, and in every instance to determine mentally whether the substance used be right or wrong.

But whatever may be the course which the anticipated legislation may take, or the nature of its provisions, it cannot be doubted that the claims of the Pharmaceutical Society to recognition, as a body qualified to deal in poisons, will be admitted. It is therefore desirable that all qualified chemists and druggists should come forward and join the Society, the real object of which is, not to seek exclusive privileges, but to secure the benefit of all. I am glad to say that there are very gratifying symptoms of a fuller appreciation of its objects and benefits, and of an increasing desire to become members, he result of which has been a large addition to our number both by admission and restoration.

It seems reasonable to expect that this desire will spread, now that the chief obstacles with regard to the time and the nature of the examinations have been removed by the wise resolution of the examiners in London, not only to have separate examinations for those in business, but to make them more practical than technical.

No druggist then, who has a practical knowledge of his business, who is well acquainted with the appearance, the uses, the doses, the composition, and the usual tests and modes of preparation of the various substances used in Pharmacy, need fear the examination; and I am sure that every one who wishes to stand well with himself, the medical profession, and the public, will prefer it to simple registration as a chemist and druggist, without any test of qualification.

I have observed with great satisfaction that a Pharmaceutical Conference has been established, because it affords another pleasing evidence that the labours of the Society are bearing substantial fruit. The annual discussion of those subjects in which we are most interested will, no doubt, be of great service to us, and to the cause generally, by bringing out more prominently the talents and researches of pharmaceutists, raising pharmacy to its proper place as a science worthy of special study, and affording scope for the exercise of the most powerful and most cultivated minds, and at the same time attractive enough to excite the interest, engage the attention, and relieve the toil of the humblest apprentice.

One very successful meeting of the Conference has already been held; judging from the spirit and talent displayed, we have good grounds for believing that it will be permanent, and that it will take no mean place among the scientific institutions of the country.

Let us hope that on the next occasion Scotland may be well represented, that some of our friends on this side of the Tweed may find it convenient to be present, and lend a helping hand to the cause of Pharmaceutical progress and elevation.

In drawing these observations to a close, I have to announce to you that several valuable additions have been made to the library, and new arrangements entered into with the curator, Mr. Hill, for the purpose of rendering it more accessible, and encouraging individuals to use it more extensively.

Dr. Macadam, I am glad to say, is to open the session by a lecture on Pharmaceutical Chemistry, a subject of great practical importance to us, and I have no doubt that as on other occasions on which we had the pleasure of hearing him, he will be listened to with attention, and with much profit to ourselves.

Dr. Macadam moved a vote of thanks to the President, which was seconded by Mr. Mackay, and carried with acclamation.

Dr. Macadam then read the following paper on Pharmaceutical Chemistry:—

Mr. President and Gentlemen,—The opportunity which is generally afforded me once at least every year, to meet the members of the Pharmaceutical Society, and to aid, as far as lies in my power, the interest of the public meetings, invariably recalls to my mind many pleasant recollections of the past. I can never forget that it was in connection with the Pharmaceutical Society that I delivered my first course of systematic lectures on Chemistry, and that much encouragement was afforded me in those early years by the countenance of the Society in my maiden courses of lectures, and by the energetic and disinterested counsel and kind sympathy of your excellent secretary.

When, therefore, a request was tendered to me about five weeks ago that I should occupy a part of this evening, I embraced the opportunity of being present with much pleasurable anticipation of meeting old friends, and of discoursing to them on some subject connected with Pharmaceutical Chemistry; and on thinking and rethinking over the subject matter of my discourse, my mind wandered to the great aim of all Pharmaceutical knowledge and all Pharmaceutical skill, and I saw that behind all the bottles and the dispensing-table, and above all the tinctures and the infusions, there was the great mission of all Pharmaceutical Chemistry, which was to minister to the sustainment of the bodily frame of the man animal in a state of health. And looking still more deeply, and seeing how, when the vitality of the man was ebbing from his mortal frame, the Pharmaceutical preparation appeared to resuscitate the enfeebled constitution, and how, when the vital activity was running its course in a heedless and feverish state, the Pharmaceutical compound checked the speed and reined in the display of vital force,—I then thought that the scientific vocation of the Pharmaceutist was a noble one, and that it was more closely related to individual and national prosperity than what it is often supposed to be.

Moreover, knowing well that the preparation of Pharmaceutical compounds could be more properly discussed by a professed Pharmaceutist; that the more strictly chemical properties could be more profitably alluded to in the lecture-room; and that the more immediate medical effects could be better discussed upon before you by one of our enlightened practitioners,—it became evident to me that my province on this occasion was to refer you to the relations which more immediately connect Pharmaceutical Chemistry with the vitality of the bodily frame in health and in sickness. And this department of the subject forced itself upon my attention, alike from its being one which I have had great personal delight in studying for some time past, and because it appeared to me that it would afford matter of discourse which would be novel to many present here, and therefore command your earnest attention.

The connection which subsists between the food of the animal and its growth and sustenance, has long been observed in a partial way, and the necessity of a supply of food for the building up of the animal structure, and the repair of injury, has been universally admitted. It has remained for more recent physiological researches, however, to show conclusively that the food of the animal does not only minister to the increase of its bulk and to the replenishment of the wear and tear, but it also supplies a certain amount of force, which the animal avails itself of when asleep and when awake, and on which it relies for the bodily strength it possesses, and for the force it exerts in daily work for daily bread. And it has become equally apparent that the Pharmaceutic preparation performs its important functions in the animal economy, by directing and controlling the animal functions, and assisting the vital powers to remove impediments which retard the changes which are consistent with proper health. The animal frame is in a state of incessant change, and demands not only that the vacancies in the structure should be filled in, but that the useless decayed matter should be removed. Diminution of the supply necessarily leads to impoverishment of blood and body, and delay in removal of used up matter leads to contamination of blood and unhealthiness of body.

The numberless transformations which are daily occurring in the animal structure are directed or controlled by vital activity or vitality, which is the pilot or helmsman which guides the matter and force in their sojourn through the animal economy. Many of the changes which occur in the bodily frame, which were a few years ago regarded as mysterious, are now explained by physical and chemical laws, and much that still has baffled the insight of man will undoubtedly be unveiled in years to come.

No man of intelligence believes it possible that human ingenuity will ever succeed to grapple with dead matter and impart life to it, but it is undoubted that the vital activity displayed by an animal when once created by the Designer and Upholder of the universe, can be influenced materially by natural forces, and is much under the control of outward circumstances. The forces which more or less influence vital activity are heat, light, electricity, magnetism, and chemical affinity, and both externally and internally they perform important functions, and must be regarded as necessary stimuli.

Heat is a most important force in relation to vital phenomena. The higher animals are much influenced by sudden elevations or depressions in temperature. Birds which have an average warmth of 110° Fahr., when reduced to about 80° Fahr. succumb to the effects of the cold, and man and other mammalia which have a temperature ranging from 98° to 102°, cannot generally be reduced below 70° Fahr. without fatal consequences ensuing. The majority of the higher animals can conform to circumstances of external heat and cold, and by the development of more or less internal heat counterbalance, to some extent at least, for the external variations in temperature. But where the supply of combustible matter within the living structure is sparing in quantity, and starvation ensues, the internal source of heat day by day decreases in amount, and correspondingly the vital activity becomes less powerful, and dwindles away till the flame of life flickers and then dies out. Before the last stage has been reached, artificial heat from external sources may revive the vital activity for the time, but where the production of heat internally has almost failed, the vitality of the animal sinks and sinks till it is extinguished. There are some exceptions to the rule, that decrease in temperature for 30° below the normal heat proves antagonistic to the sustainment of vitality. Thus the polar bear and marmot, having laid up a store of fat or combustible matter, can pass into a hybernating state—a condition of torpor or sleep, and live for months in a state of dormant vitality, where the pulsations decrease from 150 to 15 per minute, or $\frac{1}{10}$th of the whole, and the respirations, which number in active life 500, fall to 14 per hour; whilst the temperature of the body may be reduced to within 2° or 3° of the freezing-point of water. These hybernating animals awake from their condition of dormant vitality when the temperature of the air rises, and renew their vigour, having only lost during their long sleep the store of fat which they formerly possessed. All animal functions proceed more or less quickly as the temperature is increased to a reasonable extent; and the stimulus which external heat imparts to animal vigour may be well illustrated in the Triton, or water newt, which when it loses a limb cannot restore it at low or winter temperatures, but in summer weather, when the temperature ranges from 58° to 75° Fahr., the Triton proceeds to make a speedy restoration of the lost limb. Another illustration of the effect of external heat in giving a stimulus to vital activity is observed in the hatching of the eggs of birds as well as those of serpents, where at ordinary temperatures the vitality of the germ lies dormant, and is only stimulated to action by the continued influence of a higher temperature.

Light also exerts its stimulating powers in vital activity. In the vegetable kingdom the absence of light is denoted by a sickly growth and a blanched aspect, and by the want of that solidity of structure and healthiness of stem and root which the plant exhibits where favoured by sunshine. The effect of light on the animal kingdom is not less decided. Tadpoles, when they are excluded from light, and whilst they may be supplied with abundance of proper food, and the water containing the air they require for respiration is a constant running stream, do not in the absence of light develope themselves further into frogs, but remain tadpoles, increasing in size no doubt, but still only tadpoles,—in fact they become merely monster frog babies. During the hatching of the silkworms' eggs, the influence of light is decided, as, in the dark, few of the eggs are hatched as compared with the number brought out in good light. Even human beings are influenced by light. The inhabitants of cellars and dark caves have a tendency to deformity, and the lighter our rooms are, and the more we are exposed to light, then there is the less liability to deformity. In the hospitals in London and St. Petersburg, it has been observed that in the wards which are best lighted, and especially those which have a southern exposure, there are more recoveries of the sick, and these recoveries are more speedy than in the darker wards, including those having a northerly exposure.

Electricity and magnetism likewise play an important relation in the animal kingdom. The electrical and magnetic changes in our atmosphere undoubtedly influence all organic structures, and much of the depression or elevation of animal spirits from day to day may be probably ascribed to such changes. The influence of electrical storms in souring milk, beer, soup, and other organic substances is well known, and it has been long observed that the passage of a lightning flash through the animal frame, not only causes death, but renders the body more liable to putrefaction, and probably also leads to the coagulation of the albumen of the blood and other juices and liquids.

The relations which subsist between the physical forces and the vital activity of the animal, is only partly observable when we confine our attention to heat, light, and electricity and other forces, as acting externally in the animal economy. It is only when these and similar forces are recognized to be present in the food or medicine which are partaken of internally, that a more full insight is gained into the dependence of vitality upon the physical forces. And even then comparatively little can be known or observed unless we carry along with us the important doctrines and conclusions derived from the study of the mode in which one force can pass into another.

Modern scientific inquiry has done much to establish the two following points:—

1st. That the food of the animal not only supplies material to build up the structure and to replenish waste, but that it also yields force which can be stored up in the animal economy and used, as necessity may require, in the display of vital energy.

And 2nd. That all the physical forces—heat, light, electricity, motion, magnetism, and chemical affinity—are transmutable one into the other, and that they can directly and indirectly minister to the vital force of the animal.

It will conduce to perspicuity in the study of this intricate and highly philosophical department of science if I refer first to the mutual convertibility of the physical forces, and thereafter observe the mode in which these can operate to sustain the vital activity of the animal. And I may state at once that the views held by scientific men on these points at the present day are mainly due to the labours of Mayer and Helmholtz on the Continent, and of Faraday, Grove, Jones, Thomson, and Tyndall in this country.

The forces which have specially been experimented upon so as to exhibit the transmutation of one force into the other, are motion, heat, electricity, light, magnetism, and chemical affinity. Motion becomes heat when we rub or clap our hands; when two pieces of wood are rubbed against each other, as practised by uncivilized nations in order to procure fire; when the blacksmith strikes rapidly the rod of iron till it becomes sensibly red-hot; when a nail is held to a grindstone in motion till the nail becomes unpleasantly warm, and when the badly greased axle of the railway carriage admits of sufficient friction being exerted between the axle and its bearings so as to raise these to a red-heat and set fire to the carriage. Motion becomes electricity when two pieces of white sugar, or two quartz pebbles, are struck together in a darkened room, and a luminous electrical glow is developed; when two clouds rub against each other in the atmosphere, giving rise to one form of the lightning or electrical flash, and when a glass rod or cylinder is subjected to the friction of silk, as in the ordinary frictional electrical machine. Motion can pass into light when the heat of friction is sufficiently high to appear as light.

Heat becomes motion, as may be evidenced during the fusing of the metals when the motion of the particles is developed; by the passage of ice into water and subsequently into steam, when the molecular motion gives rise to much dilation, and by the expansion of the liquid in the thermometer, which is a measurer of the intensity of heat, by the motion of the particles of the fluid. Heat becomes electricity, as observed in the thermo-electric batteries, where the heating of two metals in contact with each other developes electricity. Heat becomes light when it impinges upon a solid body, as by the introduction of a piece of platinum or infusible fire-clay in the flame of hydrogen, when a brilliant light is developed from the heat of the burning gas. Heat becomes chemical action, as in our fires and gas-jets, the combustibles in which will not burn till a lighted taper is applied, and the heat so brought in contact with them determines chemical affinity between the combustible and the oxygen of the air; and in the explosion of gunpowder by the application of a heated rod, when the heat determines a new chemical arrangement of the particles of the gunpowder.

Electricity becomes motion when the lightning flash strikes a house and dislodges the stones. Electricity becomes heat when a powerful current is arrested in its course by its passage along a thin wire, or when the lightning flash sets fire to combustible substances. Electricity becomes light when it bridges over a short space between two charcoal points, and gives rise to the electric light. Electricity becomes magnetism when the force conveying the current is wound round a piece of soft iron, which is immediately converted into a powerful magnet.

Light becomes chemical action, as in the photographic processes, where it developes a change in the chemical nature of the substances on the photographic plate; and in the formation and fading of natural and artificial colours. The sun's heat and light, lying dormant in the coal and wood, become chemical action during the combustion, which then developes itself as heat and light once again.

Magnetism becomes motion when a magnet draws or moves towards itself the iron keeper or nails which are placed in its vicinity, and the development of motion from magnetism is most clearly evidenced in the electro-magnetic machines which revolve with greater or less rapidity. Magnetism is converted into electricity in the magneto-electric machines which are now so largely employed for electro-plating and electro-gilding, and for telegraphic communication.

Chemical affinity becomes motion during the combination and decomposition of substances when there is a molecular rearrangement of the atoms. Chemical affinity developes itself as heat in the operations which occur in our ordinary fireplaces, where the chemical union of the oxygen of the air with the coal gives rise to heat. Chemical affinity passing into electricity occurs in every kind of galvanic battery where the chemical action of the acid liquid upon the zinc plates developes a sensible amount of electricity. Chemical affinity becomes light, as evidenced in the burning of every candle and gas jet, where the oxygen of the air enters into chemical union with the oil or gas, and yields light.

The foregoing illustration of the correlation of the physical forces will suffice to show that one form of force can pass into and become another form of force; and that as there is no loss of matter on the surface of the earth, there is likewise no loss or annihilation of force. The sun, which is not only the centre and mainspring of our planetary sphere, but is also the great reservoir of force for the planetary orbs, is unceasingly throwing out force, and as unceasingly absorbing force from planetary space. The heat thrown off from the surface of the sun is equal to what would be evolved by the combustion of three-fifths of a ton of coal on each square foot of surface during each hour, and the temperature is as much higher than our artificial sources as the light of the sun is above all artificial sources of illumination. The heat evolved by the sun is so great, that a cylinder of ice forty miles in diameter driven with the velocity of light, viz. 192,000 miles in a second, would be liquefied before it reached the sun; and during every minute the sun radiates forth heat sufficient to boil 12,000,000,000 of cubic miles of ice-cold water. The proportion of the heat of the sun which falls the upon earth is less than a 2,000,000,000th of the whole heat-force evolved from that great calorific luminary, but this moiety is sufficient for the mighty physical changes which occur in this comparatively pigmy world, but to us a great globe. The sun's heat and light are absorbed by every plant, and become stored up in the wood and food supplied by the vegetable kingdom, so that when the wood is burned in our fireplaces, the heat and light of the sun are evolved for economic purposes; and when the food is partaken of by the animal, and the elements are burned within the animal frame, the sun force developes the animal warmth, and becomes the motive agent which enables man and the other animals to perform their allotted tasks. The coal is fossil-wood with its store of solar force absorbed many ages ago, and the fat and muscle of the animal are aggregations of atoms held together by solar force, and suitable for future use. The sun not only guides our planet in space, but it raises water in vapour from the ground and surface of the sea, and rains it down on upland districts, giving rise to streams, and supplying the running force which moves the water-wheel of the factory. The sun, too, causes the motion among the particles of the air which gives rise to local and trade winds which move our vessels from shore to shore, and drive our windmills; and influencing the waters of the ocean, the sun gives rise to the water-currents so well instanced in the Gulf-stream, and to the tides directly and indirectly through the moon. The solar orb directs the magnetic and electrical storms which more or less influence the earth at all times, and which, probably in an intense degree, as developed within the crust of the globe, give rise to earthquake action and volcanoes. In short, the sun is the all-motive agency in the physical world.

We are now in a position to understand the remaining proposition, viz. that the food of the animal not only supplies material to build up the living structure and to replenish waste, but that it also yields force which can be stored up in the animal economy, and used, as necessity may require, in the display of vital energy. In the discussion of this subject, it matters little whether we regard life as the mode of activity peculiar to certain organized beings, or as the special agency inherent in each organized structure; as in either case life cannot be considered as derivable from physical forces, but must be acknowledged to be a mysterious agency implanted in the animal by an all-wise Creator, and which directs or controls the matter and force which enter the animal economy.

The physico-chemical conditions which minister as stimulants, have been stated to be both external and internal, and the latter are supplied directly or indirectly by plants. During its growth, the plant has built up in its structure not only matter, but force in the form of chemical affinity, and when the plant is partaken of as food by the animal, the matter and the force become available to the animal. Certain of the plant elements go to form fatty tissue, which can be stored in the animal frame and form a reservoir of fuel which can be burned at a future time; and part is used directly as fuel, so that by its combustion the animal warmth may be sustained. Certain of the other compounds of plant matter are elaborated by the animal into muscular and nervous tissue, and are stored up as force matter in the animal frame, whilst in other part they rapidly undergo changes, and by their disintegration they yield the force exerted by the animal.

These functions which the food of the animal fulfils, are very much the counterpart of the processes which occur in an ordinary steam engine. A stock of coal is used in the fireplace, which by its combustion supplies the requisite warmth, and a supply of water is raised into steam, and gives rise to motive power; so in the animal economy, the elements of food which can form fatty tissue are burned in the animal structure so as to supply animal warmth, and the compounds which form nervous and muscular tissue are destroyed so as to yield force which is displayed as vital activity. Certain of the food compounds undergo change in the blood, and there yield heat and force, whilst others are stored up as fatty, nervous, and muscular tissue. In the building up or construction of those parts, heat and force are expended which can only be obtained by the destruction of another portion, which may however be more or less supplemented by external heat.

The animal system is in a state of incessant motion, and therefore there must be incessant change. The destruction of the animal tissue during the display of the nervous and muscular functions, gives rise to the development of force in two ways:—first in the passage of matter from the living to the dead state, when the force exerted by the plant and the animal in the production of organized tissue is evolved; and second, in the disintegration and separation of the compound atoms of muscle from each other, and the resolution of those compound atoms into more simple substances.

The motive force, therefore, which is exhibited by the animal, is obtained by the destruction of muscular and nervous tissue, and the breaking up of similar compounds which are flowing in the blood. Labour, which requires the strength of the arm, and thought, which is the work of the brain, alike necessitate the destruction of tissue and the evolution of force.

The strict connection between the destruction of fatty and muscular tissue, and the amount of work done—which is the vital activity displayed by the animal—has received ample confirmation by the researches of Dr. Edward Smith. When the human body is in a quiescent state, but not sleeping, the amount of carbon and hydrogen burned during one hour evolves heat sufficient to raise the body or a similar weight of water $2\frac{1}{2}°$ Fahr., and one-half of this quantity is only produced when the body is asleep. During hard work, as in ascending a hill at the rate of 1712 feet per hour, or in working a treadmill, there are five times as much carbonic acid evolved, indicating that a five-fold destruction of matter has been occurring in the animal economy. Of this increased amount, it is known that one-fifth is alone required to be expended in the mechanical work of raising the body to the height of 1712 feet in the hour, so that four-fifths of the whole heat evolved during the hour have escaped as heat, and hence the cause of the perspiration which generally accompanies mountain rambles. There is apparently, therefore, in the animal economy a loss of power in the form of heat, but in reality the available motive power is greater than what can be obtained from the best constructed thermo-dynamic engine, where only one-eighth of the force produced from the combustion of the carbon and the hydrogen, is obtained as motive power, and the remaining seven-eighths are lost in the form of heat. The animal body is therefore a more complete motor machine than the steam engine, and it illustrates to us even more forcibly than an ordinary machine can do, that whilst there is a circulation in force, there is also a conservation of force, and that there is no annihilation of power. The forces of heat and light which the sun supplied to the plant during its growth, and which the plant stored up in the chemical compounds it elaborated, have been handed over to the animal when the plant was partaken of as food, and the animal in its turn has disposed of them as heat and motor force, so that what the plant abstracted from nature has been restored by the animal to nature; and this statement applies equally to force and to matter.

The doctrine of perpetual motion is one which is justly scoffed at, so far as the possibility of its being attained by human ingenuity or invention, but perpetual motion is fully carried on in all the relations of the mineral, vegetable, and animal kingdoms, and in the workings of this great universe.

In the numberless changes to which matter is subjected in the animal economy, let one atom lose its place or be tardy in its movements, and the system becomes deranged, and the Pharmaceutical compound is called upon to aid vitality in ridding the body of the troublesome atom, and in establishing order again. Let the forces which are evolved from the disintegration of the food compounds, whilst sojourning in the animal structure, be slow in their evolution, and the system become debilitated, then the function of the Pharmaceutical preparation is to nerve the sinking frame; and if the forces are unduly exerted and the animal economy is running a heedless course, then the Pharmaceutical preparation assists normal vitality in reducing the body to a quiescent state.

In all these processes, no doubt, there is much of a mysterious nature, and much which we cannot comprehend, and may never be able to do so. What vitality is in essence is beyond our view. We can observe its mode of action—to some extent we can control its mode of action by the administration of food and medicine, and by external forces, but we can never originate it. We can create nothing, and when once life forsakes the plant or the animal, all the cunning devices of man fail to influence its movements and are powerless to restore it.

Certain it is that in the hands of the great Creator of the universe, the world rolls on its course, and each plant and each animal ministers to our daily wants; and possessing apparently the same living powers, the wheat and the potato, the corn and the apple yield us food; and the poppy, cinchona, and nux vomica, yield us medicine; whilst all, in their relations of feeders of matter and of force to the animal structure, demonstrate, not only that we are fearfully and wonderfully made, but read us the lesson, how marvellously well each part of nature performs its allotted task, and how nicely balanced are all created things.

A vote of thanks, proposed by Mr. Blanchard, was cordially given to Dr. Macadam, for his interesting paper.

A specimen of scammony root, imported from Killis, in Asia Minor, by Mr. Ransom, of Hitchin, was presented to the Society for the museum. Thanks voted.

Howell's new capsule for poison bottles was also submitted to the meeting. A long discussion took place, and while the ingenuity of the application was admired, the propriety of securing any dispensing bottle, whether containing poisonous substances or not, was much doubted, and ultimately the whole subject was remitted to a committee to consider and report to a subsequent meeting.

The Secretary then read over a list of new books just purchased, and named the presentation by Dr. Borland, of Kilmarnock, of the London Dispensatory of 1751, and the Edinburgh Pharmacopœia of 1752. Thanks were voted to Dr. Borland for his contribution.

The new arrangements in connection with the library for the present session were then announced, and the meeting adjourned.

The second meeting of session '64–5, was held in St. George's Hall, 119A, George Street, on Tuesday evening, 13th December, at 9 o'clock; Mr. Kemp, President, in the chair.

Before the commencement of the business of the evening, Mr. Mackay made the following remarks in presenting a bust of the late Jacob Bell:—

I have now much pleasure in presenting to the Society here, a bust of our late lamented friend and founder, Jacob Bell. It is the gift of Thomas H. Hills, Esq., of London. Some time ago the original bust was executed in marble, at the expense of Mr. Hills, who, in that liberal spirit which is so truly one of his leading characteristics, gave it as a memorial to the Society in Bloomsbury Square, where it now stands in a very prominent position. All who have seen this original, or the copy now before you, pronounce both to be very faithful representations of the expressive and intelligent countenance of the late Mr. Bell. Many now present will, I doubt not, be able to add their testimony to this statement. I am sure I speak the sentiments of those now hearing me, when I say, that while to the present generation of Pharmaceutists no monument is required to keep alive in them, either the memory or esteem of Jacob Bell; yet it cannot be doubted so faithful a likeness as that now before us, will in no way lessen our appreciation or admiration of so much departed worth, while to those who are to follow, its possession cannot but prove a source of unmingled satisfaction.

After a few remarks from the President, as to the unwearied labours of the late Mr. Bell, and the bright example he had left behind him, he proposed a cordial vote of thanks to Mr. Hills for his kind and appropriate gift, which was seconded by Mr. Blanchard, and carried with acclamation.

Professor Archer, of the Edinburgh Museum of Science and Art, then read the following "Notes on Brazilian Pharmacy," which he illustrated with specimens of the different articles named:—

Oil or Butter of Cacao.—Very few solid vegetable oils would have stronger recommendations to use in Pharmacy than this, if it were obtainable in sufficient quantities, but the value of the nuts for making the diet drinks, cocoa and chocolate, prevents any very considerable quantities being made. The Brazilians, however, make sufficient for their own purposes, and small quantities are exported by them to Portugal, France, and England, where its sweet and bland qualities have made it much valued for lip salves, unguents for chapped hands, and for pomades, for which purposes it is eminently fitted by its neutral properties. No vegetable fat is so devoid of odour, or so little liable to rancidity. It is obtained by bruising or grinding the kernels of the nuts and boiling them; by this means the oil is easily separated and floats to the surface in a liquid state, but solidifies on cooling, when it is taken off, remelted, and clarified. The nuts yield nearly fifty per cent. of this fat. In the cocoa plantations the oil is used for burning. The Brazilians have discovered a peculiar property in this oil, by which it can be converted into a permanently fluid state, and its illuminating powers be very greatly increased. They distil from the liquid caoutchouc, or milk of india-rubber tree, a spirit which they call *caoutchoucine*, and a very small quantity of this added to the cacao butter renders it very limpid, and increases its light-giving properties. If the demand for the oil should ever be much increased in Europe, there is no doubt it might easily be obtained.

Andiroba, Carapa, Carab, or Crab Oil.—Another vegetable butter, which is extensively used, not only in Brazil but in most parts of South America and the West Indies. It is obtained from the kernels of carapa nuts, the fruit of *Carapa guianensis*, Natural Order *Meliaceæ*. Wherever it is known, it has a great reputation as an external application for rheumatic pains and as a vermifuge, besides which, notwithstanding its rather disagreeable odour, it is in great repute as a pomade, having the property of preventing premature greyness and baldness. No proper analysis of this oil has been published, but its properties probably reside in some peculiar bitter principle, as the oil has a strong bitter taste; besides its medicinal virtues it is much used for oiling steel and iron articles, as it is held to be a remarkable preservative from rust. There is a liquid andiroba oil, but how it is obtained or what its especial qualities are is not known.

Cumaru Oil.—This is obtained from the seeds called Tonquin or Tonka Beans, the produce of the one-seeded legumes of *Dipterix odorata*. It is of two kinds, one solid and the other liquid. The former is obtained by crushing and boiling the seeds, by which the oil is liberated, and when the water is cold it is removed in a solid state, remelted and clarified. The liquid oil is procured by expressing the sesds; both are used in perfumery and for ulcerations of the mouth and lips; but for the perfumer the liquid oil is much the more valuable, as it contains most of the active principle of the seed, *coumarin*. This peculiar organic principle is not confined to the Tonquin bean, but is found in the Woodruff and Melilot, and gives its delicious odour to our hay-fields, through the vernal grass *Anthoxanthum odoratum*. It is easily obtained from the Tonquin bean by alcoholic digestion, and it is abundantly deposited in fine needle-shaped crystals in the liquid oil; its composition, according to Miller, is $C_{18}H_6O_4$, its melting-point is 122°, and its boiling-point 518°; if boiled with nitric acid, it forms first nitro-coumarin $C_{18}H_5NO_4O_4$, but if boiled too long it passes into carbazotic acid, $HO,C_{12}, H_2NO_4O_3$. If boiled with a concentrated solution of hydrate of potash, it is converted into coumaric acid combined with potash. This change is effected by its assimilation of the elements of water in the hydrate.

Alligator Oil, Olio de Jacare.—This is expressed or melted from the adipose tissue of the alligator. It has a strong nauseous smell. It is considered a powerful remedy, used as a liniment in rheumatism; its other uses in Brazil are for burning in common lamps, and for mixing with hydraulic cement.

Mantega Oil or Turtle Oil, obtained from the eggs of the turtle called *Emys scabra*, is procured in great abundance from the eggs deposited by the animals to be hatched in the warm sands of the islands of the Amazon. The quantity yielded by each annual turtle-egg harvest is estimated at from 25,000 to 30,000 gallons. Each collector takes a boat to the haunts of the turtle, and the eggs as they are collected are thrown into the boat and smashed by trampling on them. The heat of the sun soon causes decomposition, and the oil separates and floats on the top of the putrescent and stinking mass, from which it is skimmed off and filled into jars; the chief use of the oil is for cooking, instead of butter, by the poorer classes. But it is generally used as a cure for rheumatism by external rubbing.

Oil of Sassafras.—This is a beautiful essential oil of the nature of turpentine, obtained from the bark and wood of *Nectandra Cymbarum*, it has an agreeable camphoraceous odour, and is much used as a rubefacient in rheumatic affections. It would be very desirable to ascertain if it could be supplied to this country as a large article of commerce during the present high price of turpentine, as it is even a better solvent of many gums, and would be of great value to the painters and varnish-makers.

The Puchury nuts or Sassafras nuts used for flavouring chocolate, etc., are the cotyledons of the seeds of another species of Nectandra, *N. Puchury*.

A vote of thanks to Professor Archer, proposed by Mr. Aitken and seconded by Mr. Stephenson, was enthusiastically passed.

Specimens of four varieties of dried flowers for scenting teas, from Canton, were presented from the Society in London for the Museum in Edinburgh.

The Report of Committee appointed at last meeting, on the use of means to protect poison-bottles in dispensing, was promised at the next meeting.

PROVINCIAL TRANSACTIONS.

LEEDS CHEMISTS' ASSOCIATION.

The Second Meeting of the Session was held at the Library of the Association, on the evening of November 16, 1864, the President (Mr. Haigh) in the chair.

The President delivered the following address:—

I congratulate the Members and Associates of the Leeds Chemists' Association upon its having safely passed the critical period of the first two years of existence. This is the surest guarantee that we shall hold together as a society, and continue to have these pleasant meetings, which are so well calculated to confirm and strengthen the friendly relations which exist among us, while, at the same time, by their means, we carry out the primary objects of our association. It is a great advantage also, that by its means, with very little delay, we can so readily meet together to express an opinion, in our collective capacity, on any matter affecting the trade, or upon any subject of general interest, such as the Metrical System of Weights and Measures, Poison Bill, etc. This is important, when it is borne in mind what a disposition there is in the present day—no doubt with the praiseworthy object of improvement—to alter existing regulations of all kinds. Praiseworthy this disposition is, to a certain extent, but, like every other good thing, it may be carried too far. Most desirable it is that every *practicable* arrangement which can be devised should be brought into operation, for the prevention of accidental poisoning, and I hope that, at no distant date, the intelligence of the age will accomplish this; while, at the same time, powerful medicines shall be as *readily* procurable as at present, in the constantly recurring cases of urgent necessity. I think there is no doubt of the correctness of the opinion of our Committee in their last report, in which they say, "It is certain that the greatest attainable security to the public from accident, in the use of poisons, can only be reached by raising the standard of character and education, in those who deal in and dispense them." It is this intelligence only that can deal with another matter, which may be said to be in immediate connection, and which, I think, no act of the Legislature could reach; I refer to the class of articles which are dangerous if improperly used, in fact, poisonous, but which are *not* included in any list of poisons that I have seen. In point of fact, to answer the question—What is a poison? seems to me more difficult than to answer the question of a late celebrated statesman, "What is a pound?" Is Saltpetre a poison? Is Tartaric Acid a poison? I have known instances of persons poisoned by both these articles, and yet it could never be considered that these and similar articles should be included in a list of poisons! I mention them, more particularly because they bear upon another matter, respecting which, I think, a word may not inappropriately come from me—I mean shop arrangement. I have seen or read of two bottles of the same size, on the same shelf, labelled "Sodæ Tart." and "Acid. Tart." Half an ounce of the latter sent out in mistake for the former produced death. I remember an instance of poisoning by half an ounce of Saltpetre being sent out instead of Epsom Salts. I have seen "Mag. Sulph." and "Zinc. Sulph." in the same row of drawers, also "Hydrarg. Chlor." and "Hydrarg. Bichlor." in the same row of bottles. These few remarks will serve to draw our attention to the great importance of careful shop-arrangement, and of its absolute necessity in respect to dangerous articles. While I am on this subject I cannot refrain from saying, that if it were for no other merit than the care and pains with which, month by month, the Editors of the 'Pharmaceutical Journal' bring before the trade the various accidents and disasters occurring from poisons and other matters, the conductors of that Journal would be entitled to our thanks. I am satisfied that the good done in this way is incalculable. I will say here, that for years past I have constantly looked through this report, and also been careful to call the attention of my assistants to it. It cannot do otherwise than cause greater care and thought, and I commend it, not only to the younger members of the trade, but to all of us, how long soever our experience may be.

In an address like the present, it would seem an unaccountable omission, if I did not make some reference to the British Pharmacopœia, of which, there is no doubt, it may be said, that it has not been favourably received by a portion of the medical profession and others. It is a satisfaction to me publicly to state, that I do not participate in these unfavourable views. No doubt it has faults, many faults, both of omission and commission. It would be a most extraordinary thing if it had not. It was a great work to accomplish, under unfavourable circumstances, by a number of persons situated at considerable distances from each other, and having many difficulties and prejudices to combat with. I think injustice has been done to these gentlemen, and they have received few thanks, although no body of men could be more properly entitled to them. By their efforts, we have now one Pharmacopœia for the whole of Great Britain. And, although I should like to see some old formulæ re-introduced, I trust, in a little while, the portion of the public whom it more immediately concerns will regard it as entitled to universal adoption, and that, like the British Constitution, it will never be subjected to any revolutionary assaults, but only such well-considered and deliberate alterations and amendments as the intelligence and science of future years may bring to bear upon it.

With respect to the practical, every-day operations of the shop, I will name one or two things. The new Pharmacopœia contains the well-known mode of preparing Pilula Plummeri with castor oil. He must have been born a genius who invented this mode of dealing with such a mass. I need hardly say that this article is now called by the jaw-breaking name of Pilula Calomelanos Composita. Another little matter which I will name is, that during the prevalence of influenza in this town, when, the older portion of us will remember, there was such an unprecedented demand for Tinctura Camphoræ Composita that there was not time to prepare it in the ordinary way, the remedy was sometimes made by ascertaining the amount of Opium required, which was contained in Tinctura Opii, and by lessening the quantum of spirit accordingly the article was prepared in a few minutes. Perhaps this might have been done with boiling water, but I think not so well. I mention these little matters, in order that I may submit for the consideration of our members and associates, the advisability of giving us some papers during the ensuing monthly meetings, upon these ordinary, every-day, practical manipulations, required in our business. I know some members of our Society who can give us valuable information on these matters, and I hope they will do so.

I am desirous, as your President, of referring to the interesting and clever papers which were read to us by two associates, during the past year. I trust that they will not only favour us again during the present year, but that their excellent example will be followed by others of the young men connected with this association.

I also venture to express the wish that the example of our little association in Leeds, which includes members of both the Pharmaceutical and United Society, could be followed by a union of those societies. The progress and large amount of support which the United Society has obtained throughout the length and breadth of the land, may, I think, be regarded as proof that the object which the Pharmaceutical Society has always had in view, namely, to unite in one society all the members of our business, is in reality the object and wish of the entire trade. If any one will read the publications of both societies, I defy him to come to any other conclusion, than that the object of both societies, and the mode in which both societies would carry out that objeet, are exactly and entirely identical. If such is the case, I ask, what is there to prevent the amalgamation of the two? In my judgment there is nothing. If a deputation of two or three gentlemen from each society were appointed to meet, who were really wishful to effect this most desirable object, I am confident they would effect it, and the more so, because I have not met, at any time, with any person in our business who did not desire that it should take place.

The institution of the British Pharmaceutical Conference last year, one of the fundamental objects of which is the promotion of friendly intercourse between all engaged in the practice of Pharmacy, shows very clearly the feeling that exists in the minds of the leading men among us upon this subject.

Mr. Harvey expressed the satisfaction with which he had listened to the address just delivered. The probability that the subject of Poisons would be a matter for early legislative interference, made it fitting that the President should have given it the prominence which he had done. He concurred most heartily with what had been said about the importance of shop arrangements, and the necessity for separating those preparations whose proximity had been found by experience to lead to error. Surely the sad case at Liverpool enforced this lesson more strongly than any other. It had for many years been his practice to tie over the stoppers of bottles containing the more dangerous drugs, and he was convinced of the utility of the plan.

With regard to what had been said about the desirability of union amongst all competent persons engaged in pharmacy, he agreed with those sentiments entirely. There might be difference of opinion as to the way in which this important end should be accomplished, but he was satisfied that it was perfectly feasible. Mr. H. concluded by moving a vote of thanks to the President for his address.

Mr. G. Ward, F.C.S., seconded the resolution. He said that the address of the President was just of the kind which the Association required. It was a thoroughly practical address to a body of practical men. He was glad that allusion had been made to the hard measure of criticism dealt out to the British Pharmacopœia in many quarters. It could not be denied that the work was a most important step in the right direction, having substituted one authoritative code for three such, and having made the way for future reforms comparatively easy. With three committees acting in three distant places, a better result could hardly have been expected. Mr. W. congratulated the society upon the good attendance that evening.

The vote of thanks was passed by acclamation.

The Secretary, Mr. E. Yewdall, read a paper upon "Liquor Ferri Perchloridi B. P." He commenced by alluding to the irregularity which had been found to exist in the strength of Tinctura Ferri Sesquichlor., P. L., in consequence, to a great extent, of the insolubility of much of the peroxide of iron of commerce.* With a view to correct this uncertainty, the new formula was introduced. The author alluded to the criticisms of various writers upon the subject, and said that he agreed with the statements that the B. P. process might give a liquor of a dark, almost black colour, depositing basic perchloride when mixed with spirit of wine. But this condition was not a necessary one; it was contingent upon the temperature at which the evaporation of the solution was conducted after the NO_5 had been added. The B. P. did not define this temperature. If a low heat were used, the condition just described would occur. On the other hand, if the solution is quickly heated to 190° or 200° Fahr., violent action occurs, binoxide of nitrogen evolves, and the black turbid appearance of the solution is changed to a dark bright red. Although a flask is best adapted for effecting the solution of the iron wire, the second stage of the operation, in which NO_5 is heated with the solution, requires the employment of an evaporating dish, or accident may occur.

He considered that more hydrochloric acid was desirable than was ordered by the B. P. Instead of 10 fl. oz., he used $11\frac{1}{2}$ fl. oz., dissolving the iron in a flask stopped by a cork, with a small exit tube. Pouring this solution into an evaporating-basin, it was rapidly heated to 190° or 200 Fahr., and then gently evaporated to 10 fl. oz. This solution answered in all respects to the tests given in the B. P. It had a specific gravity of 1·339, and one fluid drachm precipitated by NH_3, gave 15·6 grains of Fe_2O_3 after washing, drying, and incinerating. The tincture made from this liquor is bright, free from any black colour, and does not deposit by keeping.

Since a solution of perchloride of iron gradually decomposes by the influence of light into protochloride and free chlorine, it should be preserved in a dark place.

The paper was illustrated by specimens, showing both successful and faulty preparations.

Mr. Abbott confirmed the statements of the author as to the possibility of preparing the solution satisfactorily, if the precautions detailed were adopted. He did not even consider that there was any necessity for increasing the quantity of H Cl.

Mr. Atkinson was not prepared to admit the necessity for a new formula, as he had not found any difficulty in getting a peroxide of iron that was entirely soluble in H Cl.

Mr. Reynolds quoted Dr. Attfield's statement that the B. P. gave a product containing protochloride, perchloride, and pernitrate of iron with free nitric acid. Such being the case, the composition of the medicine must be totally unconstant, and as uniformity of composition must be paramount to methods of preparation, he felt justified in attaining the strength of the B. P. preparation by the old method of dissolving the peroxide. He knew that some houses of great repute were doing the same.

The President quoted the preface to the late London Pharmacopœia to the effect that although certain methods of manufacture were directed for the guidance of those engaged in pharmacy, the College did not forbid the employment of other means of producing the same result. This showed that the *end* was more important than the

* Pharm. Journ. n. s. vol. iv. p. 490.

means, and since it could not be doubted that the end was to procure a pure and staple solution of perchloride of iron, it became a duty if the case required it, to use more hydrochloric acid, or attain the same object by some other means. He moved that the thanks of the meeting were due to Mr. Yewdall, which was seconded by Mr. Atkinson and carried.

MEETING OF CHEMISTS AND DRUGGISTS AT GLASGOW.

A Meeting of Chemists and Druggists was held in the Lesser Trades Hall, Glassford Street, on Thursday, 24th November, to consider the proposed Bills of the Pharmaceutical and United Societies; copies of each Bill had been distributed amongst the profession during the previous week, by the Chemists and Druggists' Association.

During the preliminary arrangement for the meeting it was matter of discussion whether it should be one of employers only, but seeing that the proposed Bills were intended to affect all the profession, an invitation was in accordance issued to all.

A deputation from the Pharmaceutical Society, Edinburgh, was present, consisting of the following gentlemen:—Mr. Kemp, President; Messrs. Brown, Ainslie, Blanchard, Young, and Mr. John Mackay, Secretary.

Mr. C. Buott, Registrar of the United Society, was also present at the meeting.

Amongst the employers present were the following:—Messrs. Hugh Hart, John Currie, James Murdock, John Jaap, Alexander Kinninmont, John Black, Thomas D. Moffat, John Campbell, James Taite, Peter Harrower, David P. Walker, Andrew Wylie, James N. Shearer, J. White, James Sutherland, T. H. Schlater, Clark, Hatrick, Henderson, Paterson, Taylor, Dr. Dobbie, Mr. Rait, of Partick; Mr. M'Naught, of Greenock; Mr. Ferguson, of Greenock, etc. etc.; and a large number of assistants.

On the motion of Mr. John Campbell, seconded by Mr. Moffat, Mr. Hugh Hart was called to the chair.

The Chairman then introduced to the meeting Mr. C. Buott, of the United Society of Chemists and Druggists, who at great length reviewed the policy adopted by the Pharmaceutical Council; he used the term "Council" advisedly, because he was satisfied that very many members of the Pharmaceutical Society did not homologate the policy pursued by the Council. He contended that that policy had been inconsistent, antagonistic to, and incompatible with the desires and wishes of the trade,—not a representative policy, but one of exclusion, quite different, he was sure, from that which their founder, and that great champion of pharmaceutical reform, the late Jacob Bell, contemplated; since his decease the Council had departed entirely from that plan which he originated, and which was the one great effort of his life to perpetuate and maintain, viz. to "unite the chemists and druggists in one ostensible, recognised, and independent body." He asked, had this been the result of their labours, or rather inaction, for the last twenty years? No: and hence the society which he represented sprang into existence, determined to carry out that great principle of the founder of the Pharmaceutical Society; and he was happy to state that their labours had not been in vain, upwards of 3000 members having joined the United Society, whose existence dated back only three years; this large body, which was steadily on the increase, was an "influence" and a "power to be felt," not certainly by abusing that "power," but by united action in the one great and glorious cause. An overture, he said, had been made to the Pharmaceutical Council, to effect a compromise, or rather friendly co-operation, but such was repulsed with that discourtesy which he had always received at the hands of that body. After some other severe strictures on the policy pursued by the Pharmaceutical Council, Mr. Buott apologized to the meeting for having occupied so much of their time, and that he would meantime postpone his remarks on the proposed Bills of the Pharmaceutical and United Societies, so that any gentleman present might have an opportunity of replying to what he had said.

Mr. John Mackay, of Edinburgh, then rose, and was received with much applause. He said, before proceeding to combat the severe strictures denounced against the policy of the Pharmaceutical Council by Mr. Buott, he might be allowed to express the pleasure he, along with the deputation from Edinburgh, experienced on receiving an invitation to take part in the business of the present meeting; they had on several occasions an opportunity of meeting several of their Glasgow brethren at their Annual Pharmaceutical Dinner in Edinburgh, and he was sure that they would have a lively and pleasant recollection of the kindness which on these occasions was extended towards them; he believed that this was the first time that a deputation from Edinburgh had visited their professional brethren in this city, and he had no doubt they would return gratified with their first visit. Mr. Mackay then proceeded to say, that he would not follow Mr. Buott through that labyrinth of tirade and abuse he had heaped on the Pharmaceutical Council and their endeavours; he would confine himself to one or two points. He maintained that the policy of the Council was one of consistent, continued, and laborious action, and none knew better than he the indefatigable, earnest, and constant attention which the gentlemen composing that Council gave to the affairs of the Society; he said the names alone of these gentlemen was a sufficient guarantee that honesty of purpose, and devotedness to the best interests of the Pharmaceutical Society was and could only be their sole object. If there was a name above all others, in connection with the Pharmaceutical Society, which he honoured and loved, it was that of the late Jacob Bell; several years of his professional career had been passed under his superintendence, and he was proud to say on all occasions when he visited Edinburgh he made his house his home, he had therefore every opportunity of becoming thoroughly acquainted with his views; no man, he said, had more decided opinions, or expressed them more firmly on the objects of the Pharmaceutical Society, than the late much lamented Jacob Bell; his was essentially an unwavering policy, and his oft-repeated assertion was, we have taken up a certain stand-point, and it will never do to recede from that. Mr. Mackay went on to dwell at considerable length in defence of the policy pursued by the Pharmaceutical Council, contending that the Council had in no manner whatever deviated from that steady purpose which originated with their founder, and which was their constant aim and study to carry out in all its integrity. Mr. Mackay then entered into a comparison and criticism of the proposed Bills of the Pharmaceutical and United Societies, and while agreeing with the preamble of the latter, he characterized several of its clauses as borrowed from the Pharmaceutical, and others, such as clauses six and seven, in reference to poisons, he considered quite inoperative, and moreover a matter of impossibility to draw a line in this very vexed question, where every medicine might be said to be a poison in an overdose; the clause regarding Lord Campbell's Act, Mr. Mackay stated, was not applicable to Scotland. Mr. Mackay very carefully and considerately explained the various clauses of the Bills as he went along, and at the conclusion claimed special favour for the Pharmaceutical Society's Bill, as being in every way the superior of the two.

Mr. Buott then in general terms addressed the meeting, claiming its support on behalf of the United Society's Bill, and as having already received the support of many of the principal towns of England, where the Pharmaceutical Bill was considered to be essentially unjust, and inadequate to the requirements of the trade.

At this stage of the proceedings the chairman called on Mr. Thomas D. Moffat, who he understood had some opinions to express.

Mr. Moffat said he would confine his remarks to part of the first clause of the Pharmaceutical Bill, and to the fourteenth clause; in the first clause we find, he said, "that it shall not be lawful for any person to carry on the business of chemist and druggist, in the keeping of open shop for the compounding of the prescriptions of duly qualified medical practitioners in any part of Great Britain, unless such person shall be a Pharmaceutical Chemist, or shall be duly registered as a chemist and druggist under this Act." In the fourteenth clause it is stated, "that the several fees, payable under and by virtue of this Act, shall be paid to the treasurer of the Pharmaceutical Society of Great Britain, for the purposes of the said Society." Mr. Moffat continued, now if this Bill should become law, we may reasonably expect that a considerable number of chemists in Glasgow will take their diploma as Pharmaceutical Chemists; he said there were about eighty drug shops in the Glasgow Directory, and leaving out the sums for registration which these eighty druggists would require to pay, and taking no account of assistants at all, he would reasonably expect the Society to gain an addition of forty members. Most of his friends considered this too low an estimate, but granting it for the sake of argument, it would give to the Pharmaceutical Society of London the annual amount of £42 sterling. Now he was afraid that this was the point on which any Bill would receive the greatest opposition in Scotland,—the sending of the money to London; he believed that to be the cause of the unpopularity of the Pharmaceutical Society here, and a political blunder on the part of the framers of the original Bill. A student of medicine can receive his diploma as a medical practitioner in Edinburgh, Glasgow, or Aberdeen, without the fees being sent to London, and why should not a student of pharmacy receive his diploma as a Pharmaceutical Chemist in the same towns on the same terms? In Scotland generally, and Glasgow in particular, the services of professional lecturers can be had for a small expenditure, and if the fees were retained in Edinburgh, Glasgow, Aberdeen, and other towns,—if thought desirable, classes could be established and regularly kept up, local boards for examination and general management could be instituted, and measures such as exist in London and Edinburgh set on foot; and the mere fact of money being retained in central and representative cities would give strength to the Society. This, he trusted, would be carefully considered. He had no doubt objections could be urged against this arrangement, but after a careful consideration of them all, he thought they could be easily overcome. A common objection presents itself, what would you do in the case of the large English towns? His answer to that question would be *nothing*, let us deal with Scotland alone. An apparently strong objection is, Edinburgh receives annually £50 from London; what arrangement would you make there? Edinburgh, in my opinion, would be better without it, were the fees retained, and would certainly be placed in a more independent position. During the present year, Edinburgh has transmitted to London £117 4*s.* 6*d.*, more than half of which was for examination fees, the remainder, annual subscriptions,—moreover, the last grant of £50 to Edinburgh was given with a grudge; there is no provision for its continuance in the proposed Bill, and should this Bill become law, there is nothing to prevent its being stopped, whenever the London executive may think fit. The strongest objection of all is that the Pharmaceutical Society is not on the same footing as the Scotch Universities, and that there must be some bond of union between the London and Scotch chemists; this he was willing to admit, and would not object to the registration fees and annual subscriptions, to be used as the Board might deem expedient, the surplus each year to be forwarded to London to be added to the Benevolent Fund. This he thought would do no more perhaps than place us, so far as pecuniary matters go, is as good a position as Edinburgh is at present, but with this important difference, that it would be legally secured by us. Mr. Moffat, after these considerations, begged to move the following, "That as the Bills of the Pharmaceutical and United Societies ignore and make no provision for the retaining of any part of the funds in Scotland, it is the opinion of this meeting that it would be an act of injustice to pass a resolution in favour of either, that both should be opposed, and the influence of this meeting be used with the Scotch Members of Parliament accordingly."

Mr. John Campbell then rose, but before proceeding to express any opinion on the Bills of both Societies, he begged to convey the very kind thanks of the Profession in the city to the deputation from Edinburgh, for the handsome manner they had responded to the invitation to take part in the proceedings of the evening; he then said they had now before them two Bills, very important measures indeed if allowed to pass into law; he could not see his way clear to support either Bills in their present shape, and in saying so, he was sure he expressed the general opinion of the Profession in this city. That no allowance should be made in these Bills for retaining part of the moneys for educational purposes he considered was unfair, but Mr. Moffat had so thoroughly expressed his views, that he considered it unnecessary to say more than that he cordially concurred in all that he had said, and begged to second his motion, trusting that this meeting would give it their entire support.

Mr. James Taite then moved the following amendment:—that legislative restriction is necessary to the public safety, and that one of the Bills should therefore be supported; that the proposed Bill of the Pharmaceutical Society, not being based on any ground of monopoly, is more likely to meet the sanction of our free-trade legislature, and as emanating from a Society already in existence, render a second society unnecessary.

Mr. Alexander Kinninmont then begged to second Mr. Taite's amendment, and in doing so paid a high compliment to the framers of the Pharmaceutical Bill; he considered the whole Bill as the production of men of thorough business habits, and in every way superior to that of the United Society. At this juncture an unpleasant *contretemps* occurred; the meeting being about to vote on the motion and amendment which was before it, when Mr. Buott, in fairness demanded that the Bill of the United Society should be put to the vote along with the Pharmaceutical Bill; several gentlemen rose to order, some insisting Mr. Buott was quite in order, others that he was out of order; at last Mr. M'Naught, of Greenock, proposed that that the United Society's Bill be put to the vote of the meeting, on condition that a clause was inserted in accordance with Mr. Moffat's motion (Mr. Buott having previously expressed his willingness that such a provision be included in the United Society's Bill), seconded by Mr. Ferguson, of Greenock. The chairman however ruled that the proceeding was not in order, and after a few sharp exchanges the matter dropped.

The Chairman then put Mr. Taite's amendment to the meeting, and afterwards Mr. Moffat's motion; when the latter was carried by a large majority. After a cordial vote of thanks to the chairman, and the same compliment being paid to the deputation from Edinburgh, and Mr. Buott, of London, the meeting separated.

Hugh Hart, Chairman.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—My attention has been called to a statement of mine in the report of the Glasgow Chemists' meeting in the 'Chemist and Druggist' of December 15th, viz. that "the last £50 was given to Edinburgh with a grudge." This is correctly reported to have been stated by me, but from what I have heard since the meeting, I believe such was *not* the case. By publishing the above you will oblige

Yours respectfully,

Thomas D. Moffat.

3, *Union Street, Glasgow, December 22nd*, 1864.

MEETING OF CHEMISTS AND DRUGGISTS AT LEICESTER.

A meeting of the trade was held, on the 20th ult., at the Three Crowns Hotel; Joseph Goddard, Esq., in the chair. Amongst those present we observed, Mr. Cooper, Honorary Secretary; Mr. Salisbury; J. G. F. Richardson, F.C.S.; Mr. F. Parsons; Mr. Clark; Mr. Nettleship; Mr. Merryweather; Mr. Watson; Mr. Berridge; Mr. Butler; Mr. Buzzard, etc. etc.

The Chairman observed that the objects of the meeting were well known, he would therefore call upon the Honorary Secretary to read a letter which he had received from the President.

Mr. Cooper then read the letter from the President, and the proposed Bill was afterwards read, each clause being discussed seriatim.

The Chairman then called upon Mr. Richardson to propose the first resolution.

Mr. Richardson said he had great pleasure in proposing the first resolution,—"That this meeting, having read the proposed Bill for regulating the qualifications of Chemists and Druggists, published in the number of the 'Pharmaceutical Journal' for May, 1864, does hereby express its opinion in favour of the said Bill, as being desirable in the public interest, and in the interest of the body of chemists and druggists." He felt assured that, from the manner they had all received the Bill, it would not be necessary to detain them with any lengthy arguments in its favour. That legislation was required was an acknowledged fact, but a slight difference, as to who should carry out this boon, seemed to threaten the unanimity of their purpose. Three Bills had he brought forward, that of the Medical Council, the Pharmaceutical Society, and the one published in the 'Chemist and Druggist.' As regards the first, it had for the present been abandoned; and the latter was not for a moment recognized, as it did not emanate from any responsible body, nor must they view it as representing the opinion of the trade, but a factious opposition, brought forward by some few individuals anxious for the emoluments of office. He believed that the numerical strength of this new society had been greatly exaggerated, and if they deducted the unpaid subscriptions for the past year, it would leave a very different result than that so frequently boasted of. He believed that many had given their five shillings as a donation, to get rid of the constant solicitations of some of its ardent partisans, and were at once dubbed members; he knew several gentlemen who had been so placed on the list, and repeated application had been made for their subscription. He had no doubt of the Bill of the Pharmaceutical Society, as it had the support of the medical profession and the trade, and had met with a most favourable reception from the Government. In conclusion, he would earnestly ask them to assist the Council, for there would, he felt assured, be some opposition offered; but with the cordial aid and support of the trade it would not avail, and he had no doubt of the result. They would, in a very short time, have to congratulate the executive of the Pharmaceutical Society on having gained their object.

Mr. Berridge rose to second the resolution. Being an outsider, he begged it to be understood that some, not of the Society, were not its enemies; he believed the Council had suffered much odium from the correspondence which was so copiously poured into the columns of the organ of the *Dis-United Society;* he had considerable pleasure, therefore, in seconding the resolution.

Mr. Nettleship wished to support the resolution; he hailed the Bill as a decided boon to the trade, and believed it would have a most beneficial effect. As regards the sale of dangerous drugs by unqualified persons, he was happy to observe that young men well qualified were setting up in large country villages, and the proper restriction would materially benefit these village druggists, and not inconvenience the public, as the simple remedies would still be vended as heretofore. As a deluded member therefore of the United Society, for he had given them a donation of 5*s*., and they had at once dubbed him a member, he had much pleasure in supporting the resolution.

The Chairman then put the motion, which was carried unanimously.

Mr. Watson, in proposing the next resolution,—"That this meeting pledges itself to the active and earnest support of the Pharmaceutical Council in their endeavours to obtain the said Pharmacy Bill, and will adopt such means for that purpose as may be considered most advisable,"—said he had much pleasure in attending this meeting, and hoped that a branch society might be established in Leicester, for their mutual advantage, and to render assistance to the executive at Bloomsbury Square on all necessary occasions.

Mr. F. Parsons, in seconding the above resolution, said that at the present he was an outsider, but considered the proposed Bill so thoroughly equitable and advantageous to the whole trade, that it deserved the warm support of all who wished for its welfare and advancement. As soon as business arrangements would allow, it was his intention to become, by examination, a member of the Pharmaceutical Society.

The motion was then put and carried unanimously.

The Chairman wished, ere they separated, to submit the plan he had adopted in his establishment for the keeping of poisons; it consisted in painting the neck of each bottle and the top of the stopper with a solution of red sealing-wax in spirits of wine, which formed a bright red, distinctive mark, and at once arrested the attention of the dispenser, as he could not fail to observe it; it was simple, might be applied to all existing bottles, easily replaced in case of breakage, and economical.

Mr. Richardson expressed his warmest approbation of the plan. He hoped the Chairman would send a specimen to be exhibited at the next meeting of the Society, as the Council were always glad to receive suggestions for the safe keeping of dangerous medicines.

Mr. Salisbury, Mr. Merryweather, and Mr. Nettleship all expressed their approval of the scheme.

Mr. Merryweather rose to propose a vote of thanks to the Chairman, which was seconded by Mr. Salisbury, and the Chairman having briefly responded, the meeting separated.

ORIGINAL AND EXTRACTED ARTICLES.

THE EXTENDED PHARMACY ACT.

In considering the desirability of further legislation in relation to Pharmacy, we may concisely render the several inquiries which naturally arise in the minds of those who would be interested in it into two or three definite questions, viz.:—

1st. What is really wanted?

2nd. By whom is the want felt?

And lastly. How far will the proposed extension of the Pharmacy Act supply the existing want?

In reply to the first query, what is wanted? we may reply, *knowledge is wanted;* for it is an object patent to the observation of all that many persons undertake the grave responsibility of dispensing powerful drugs to the public who are equally ignorant of their poisonous character and of their own incompetency to conduct such a business. The qualification for such service to the public was formerly secured by the Apothecaries Act; but that body of dispensers having become absorbed into the ranks of the medical profession, the public have now no protection against that kind of ignorance which is more pretentious than true knowledge, and which obtains (unfortunately) by appealing to the ignorance of the public a false and meretricious reward. It is true that the present Pharmacy Act throws the responsibility of the choice between ignorance and knowledge upon the public, but those who have conducted such a business know well that the exercise of such discrimination is restricted to the educated class of customers, and that the public, as a whole, is incompetent to make such distinction. Something more therefore than knowledge and ignorance in open competition is *wanted*, viz. a guaranteed standard of qualification upon which the public as a whole may rely.

2ndly. By whom is the want felt?

Firstly, *by the medical bodies generally*, as expressed by the Medical Council and endorsed by almost every practitioner, especially when he leaves the local circle of known dispensers and writes his prescription not knowing into whose hands it may fall. Secondly, by the patient who rather than trust to a local and unknown compounder, sends an order to his chemist in town for his usual remedies (if he can afford to pay for this extra insurance of exactitude); but the general public have no such guarantee, and feel still more urgently the want of a responsible and qualified dispenser in every open chemist's shop. Thirdly, by the wholesale dealer in drugs and chemicals, who feels that his best customer is the man who understands his business, and one who knows and appreciates good quality in drugs and purity in chemicals, but whose daily worry consists in the ignorance of so many dealers who know little beyond the names of the many articles in which they traffic, and whose merit as shopkeepers lies in their chaffering ability to "buy in the cheapest, sell in the dearest market."

Nor is the want unfelt by the honest, struggling, and intelligent tradesman, who having entered the business under fair auspices, has found no opportunity of embracing the advantages of a voluntary education and examination, although he recognizes their value and would fain confer these benefits upon his sons. How many of these are to be found both within and without the ranks of the Pharmaceutical Society! men who have never seen their *opportunity* of coming forward to take educational honours, and find in the unfair and cheap competition of ignorance around them a perpetual source of annoyance and degradation. How can he be justly paid for care, attention, and incessant conscientious discharge of his duty to an ignorant public, if he has to compete with ignorant and pretentious dealers on equal terms? He *wants*, therefore, to have his education and knowledge recognized as the first and fair charge upon his goods.

Lastly, let us endeavour to see how far the proposed extension will meet the existing want. In the first place, by making education and character the key-stone of the arch. This we have in the existing Pharmaceutical Society, composed of men who have for many years occupied a foremost position in the confidence of the medical profession and the public, and of those younger members who have passed the ordeals of examination, and who, after due consideration, prefer to rank themselves among the pioneers of a profession, rather than the average of a trade.

It is essential to the character of such a nucleus, that it should be voluntary and self-supporting, and the wide and liberal character of its basis is best shown by the fact that its representative Council and Board of Examiners is replenished by kindred spirits from all parts of Great Britain. Around this nucleus are gathered men of simple educational status, who rank as Pharmaceutical Chemists, and who may rest on this legal and professional basis alone, outside the volunteer corps constituting the Society proper. Then we propose to add another grade of registered chemists and druggists, who by this association may derive the advantage of registration and consolidation into a compact body without any further claims on their purse or co-operation than an examination and registration fee, paid once for all; who, if they choose, may connect themselves as Associates with the parent Society, but who enjoy a legal status and an independent position if they prefer to decline to join the Society. This is, we think, a fair balance of existing claims and of future position, and it will be for the benefit of all, that co-operation and co-registration should bind all parties together; while the volunteers are left united in the ranks of their own society to advance Pharmacy and protect the common interest of all. On the other hand division is defeat. Rival societies produce "Disunited States," and a fratricidal war is an inevitable consequence. The disadvantage attending rival constitutions has been sufficiently exemplified in the long struggle for union on the part of various medical bodies. Let us not try the effect of such a dislocation, but by a long pull, a strong pull, and a pull altogether, obtain "in things essential unity, in things doubtful liberty, in all things charity." E.

ON THE USE OF ALCOHOL AS A TEST FOR THE PURITY OF CROTON OIL.

BY ROBERT WARINGTON, F.R.S., F.C.S.

The College of Physicians of Edinburgh in their Pharmacopœia of 1839, under the article "Croton Oil," contained in the Materia Medica, gave the following directions for testing its purity:—"When agitated with its own volume of pure alcohol and gently heated, it separates on standing, without having undergone *any apparent diminution*." The alcohol is ordered to be prepared from rectified spirit by well-burnt lime, and the density should not exceed ·796. This test has been transcribed *verbatim* into various works on Materia Medica, dispensatories, etc., and is repeated in the Pharmaceutical Journal for July, 1844, vol. iv. p. 47, and December, 1849, vol. ix. p. 296, in answer to correspondents. In the latter volume, however, at a later date, May, 1850, vol. ix. p. 499, a very valuable paper, by the late Dr. Pereira, was published on the subject, entitled, "On the Alcohol Test of the Purity of Castor and Croton Oils," by Jonathan Pereira, M.D., F.R.S." As it is only with the experiments and deductions concerning croton oil that we have to deal, I shall only allude to those parts of the paper which relate to it, and that as briefly as the nature of the subject will admit.

"Experiment 2.—Eight volumes of pale or amber-coloured East India croton oil were mixed with eight volumes of alcohol, specific gravity ·796, and gently heated. In two days a separation had taken place, *the oil now measured* $8\frac{1}{4}$

volumes, while the alcohol measured only $7\frac{1}{4}$ volumes (or 10 volumes oil + 10 volumes alcohol = 10·94 oil + 9·06 alcohol). In this case *the croton oil had taken up three-quarters of a volume of alcohol*." Dr. Pereira considers that these fluids exert a mutual solvent action on each other, similar to that of ether and water. This mutual action, however, he states, "is not uniform, but varies with the samples of oil. At first," he says, "I was inclined to ascribe this variation to differences of purity in the several samples of oil examined, but I am now convinced this is not the case, and that they depend on other circumstances."

"Experiment 6.—One volume of dark-coloured English-expressed croton oil was mixed with one volume of alcohol, sp. gr. ·796, by shaking, without any additional heat, a uniform transparent mixture was obtained; and no separation took place on standing for several weeks." Upon which Dr. Pereira naturally asks, "On what does this difference depend? Does it arise from *differences in the qualities of the seeds pressed*, or from differences in the mode of preparing the oil?" He then, after acknowledging himself indebted to Mr. Redwood for his first information of these facts, quotes the test of the Edinburgh Pharmacopœia, and adds, "I have never been able to verify this statement;" and then repeats the results of experiment 6, and proceeds, "Mr. Redwood has verified the same fact with various samples of genuine croton oil," "and he finds that no subsequent separation takes place unless the mixture be subjected to *artificial cold*;" "in that case, the oil is found to have slightly increased in bulk, and the alcohol to have suffered a corresponding diminution of volume. I presume, however, that the statement of the Edinburgh College is intended to apply to the amber-coloured East India croton oil." and alludes to the results of experiment 2.

Dr. Pereira then mentions "a very interesting and important fact," that "croton oil enables other fixed oils to dissolve in alcohol;" and gives an illustration in "Experiment 17.—Two volumes of English expressed croton oil, one volume of olive oil, and three volumes of alcohol, were mixed together. By shaking, a homogeneous mixture was obtained." He then states that he considers "these various facts to be best explained by supposing that *croton oil contains some principle which confers the power of dissolving in alcohol*, and that this principle does not exist in all samples in the same proportional quantity, and hence their unequal solubility in alcohol." If "*the quantity of this solvent principle in croton seeds increases the longer the seeds are kept, we should have a ready explanation of the greater solubility of croton oil expressed in England from seeds brought from India*, and which are often musty, *than of those oils expressed in India from fresh seeds*."

Such, then, was the extent of our knowledge on this subject in 1850.

In January, 1864, the British Pharmacopœia was published, and in the Materia Medica, under the head of "Oleum Crotonis. The oil expressed from seeds in England," we find as follows: "Test.—Agitated with its own volume of alcohol, and gently heated, it forms a clear solution, from which *about three-fourths* of the oil separate on cooling." This test has been *severely criticized*, and in rather *strong terms*, in the numbers of the Pharmaceutical Journal for February and April, 1864, vol. v. 2nd ser. pp. 363 and 485. In the first of these, in a paper entitled "Explanatory and Critical Notes on the British Pharmacopœia," we read, "This test is about *true* as regards *East Indian croton oil*, but *it is not true* with *English croton oil*, which is *wholly and readily soluble in alcohol*, and the solution thus formed is permanent at ordinary temperatures." In the second, under Lecture II., "On the Organic Materia Medica of the British Pharmacopœia," delivered before the Pharmaceutical Society of Great Britain, on the 23rd March, 1864, we read, "this is *a mistake*, the *framers of the Pharmacopœia having given the test for East India croton oil instead of that for*

English oil; hence the test *is true* as regards the former, but *is not correct as regards the latter, or officinal oil, which is wholly and readily soluble in alcohol, and the solution thus formed is permanent at ordinary temperatures.*"

Now I presume that these statements, from their general context, are derived from the results published by Dr. Pereira in 1850. But if it is so, how is it that they are *not concordant with those results?* In Dr. Pereira we read "Experiment 2.—Eight volumes of East India croton oil and eight volumes of alcohol (sp. gr. ·796) gave 8·75 volumes of oil, or ten of oil gave 10·94, being *an increase* of 0·75 volume, or nearly one-tenth." But the British Pharmacopœia states that ten volumes of English-expressed croton oil and ten volumes of alcohol gave about 7·5 volumes of oil, or *a decrease* of 2½ volumes, or nearly one-fourth. Is this "*about true as regards East Indian croton oil*"? Is this "*a mistake*"? Have "*the framers of the Pharmacopœia given the test for East Indian croton oil*"? The *mistake*, I believe, lies with the *critic*, as must be evident. Such statements should surely have been carefully examined into *before they were put in print.* But I think I have said enough to remedy the error. It is also to be regretted that the experiments conducted on English expressed croton oil of 1850 had not been repeated on genuine samples of oil, expressed from seed in England in 1863, before such strong assertions as to their truth were published.

It may be asked, and very properly, how does this subject interest me? and how come I to take it up? The case stands thus:—In the month of *November*, 1863, at the time the sheets of the British Pharmacopœia were passing through the press, Dr. Frederick Farre, the London editor, requested me to try the test for the purity of croton oil given by the Edinburgh College in 1850, before introducing it into the text of the forthcoming volume. This was done with an oil taken from our own stock, and the result published in January, 1864, in the Pharmacopœia. This croton oil had been purchased in July, 1863, of Messrs. Horner, who, it is well known, press their own seed in London. The volume of oil which separated may have been stated a trifle *lower* than what it should have been, owing to the graduations at that part of the tube employed not being perfectly accurate. It will be seen, however, that this error was only of small amount, and does not affect the general statement.

On finding the published test, deduced from this experiment, so warmly criticized before the Pharmaceutical Society by one of their own professors, and the *truth* of my result so strongly questioned, I lost no time in repeating the trial, in order to satisfy my own mind on the subject. This has led me to the conclusion that the use of alcohol as a test for the purity of croton oil was really of no value, and not to be relied on in any way. Between the buyer and seller this becomes a matter of importance, and, as such, I considered it worthy of publication. The sample of oil first tried was also purchased from Messrs. Horner, in May, 1864; the experiments having been commenced in June. For the purpose of more easy comparison, the volume of oil taken in each case is estimated at ten measures, and I have noted against Dr. Pereira's experiments above the results calculated on the same quantity.

Experiment 1.—Ten volumes of English-pressed croton oil (Messrs. Horner's) and ten volumes of alcohol were mixed, and agitated together; but, on standing, they soon separated. They were again shaken, and gently warmed; a perfectly clear solution was obtained, which was set aside, and, in the course of a few hours, had separated into two layers,—the under, or oily one, indicating 9·5 volumes; the upper, or alcoholic one, measuring 10·5 volumes. The alcohol had become of an ordinary sherry tint, from the solution of some part of the oil.

About this time a parcel of foreign croton oil was notified on the drug lists for sale, of which Mr. Quincey very kindly forwarded me a sample, accompanied also by one of croton oil expressed from seed in this country about fourteen years since. The sample of imported oil was marked "ex Earl of Auckland v. Rotterdam in transit from Batavia."

Experiment 2.—Ten volumes of imported oil were mixed, as before, with ten volumes of alcohol, and briskly agitated. It soon separated, and was then again shaken and gently warmed; perfect solution followed, and the tube was set aside. In a few hours the contents had separated into two layers, the oil measuring 11·5 volumes, and the alcohol 8·5; also coloured, from solution of part of the oil. This result shows a slight increase on that obtained by Dr. Pereira from East Indian croton oil, which was, from experiment No. 2, 10·94 volumes of oil, after separation.

Experiment 3.—Ten volumes of the old English-expressed oil were mixed with ten volumes of alcohol, as before, only as they seemed to unite immediately no agitation was required; the mixture was very turbid, but exhibited no signs of separation. On being warmed, it became transparent and remained permanently dissolved. Here then was a case corresponding exactly with the results published by Dr. Pereira in experiment 6. This old oil was very thick, and when the cold weather commenced became slightly crystallized.

In consequence of this result, I procured a sample of croton oil from Messrs. Hodgkinson, Tonge, and Co., and also another specimen of the imported oil. Experiment 4.—Ten volumes of croton oil (Messrs. Hodgkinson, Tonge, & Co.) + ten volumes of alcohol were gently mixed, and then agitated briskly; separation soon occurred; the mixture was then warmed, when it formed a clear solution, which, by standing a few hours, separated into 9 volumes of oil and 11 of alcohol, the latter being much coloured, as in experiment 1.

Experiment 5.—Ten volumes of imported oil (specimen No. 2) + ten volumes of alcohol treated as before, yielded the same results as experiment 2.

In consequence of the alcohol in all these experiments becoming nearly as dark-coloured as the oil itself, the whole were put aside in a bottle for future experiment. When the result of experiment 3 was poured in, to my great surprise, the results from experiments Nos. 1 and 2 instantly formed a clear solution, and this also occurred on the addition of the separated materials from numbers 4 and 5. So that we have here the presence of 10 volumes of old oil causing 40 volumes of croton oil (composed of 20 volumes of English-expressed, and 20 volumes of imported oil) which would not dissolve in alcohol, to enter into perfect solution, and this without any application of warmth. I shall have occasion to refer to this again presently.

From these results, I was induced to try the solvent action of rectified spirit upon some of the specimens of croton oil. Experiment 6.—Ten volumes of English-expressed oil + ten volumes of rectified spirit, sp. gr. 838, were mixed as before, and well shaken together, but without solution; the mixture warmed, but still no evidence of solubility. Mechanical admixture only took place, and this was followed by rapid subsidence of the oil.

Experiment 7.—Ten volumes of the English-expressed, fourteen-years-old oil, + ten volumes of rectified spirit, were mixed together and did not separate; though turbid, the solution appeared to be perfect on the following morning, however, it was found that it had divided into two strata.

I have mentioned that these experiments were commenced in June, and the temperature of the air at that time was seldom below 70° Fahr. day or night. On the night of this last experiment, however, it was observed that the thermometer had fallen a few degrees lower. For the moment the separation of the oil was not attributed to the influence of this slight diminution of temperature, and the experiment was therefore repeated exactly as before; no solution, however, could be obtained by simple admixture, and when this was effected by a gentle heat, separation took place in a few hours by standing It was then found that as long as the temperature of the room was above 70°, the oil remained permanently dissolved, but that as soon as the thermometer had sunk three or four degrees lower, separation rapidly took place. So also with the mixed results of experiments 1, 2, 3, 4 and 5, as long as the temperature was at 68°, or above that, so long the solution was perfect; but below that point, namely at 66°, separation gradually occurred. In consequence of these interferences from the effects of a few degrees differences of heat, I resolved to repeat these experiments when the temperature of the atmosphere was lower and more equable.

November, 1864, Experiment 9.—Ten volumes of English-expressed croton oil (from Messrs. Hodgkinson and Tonge) + ten volumes of alcohol gave by agitation an emulsion which separated by standing into 8·3 measures of oil + 11·7 of alcohol. It was again agitated and warmed; it readily dissolved, but in a few hours separated into 8·2 volumes of oil and 11·8 of alcohol. The temperature of the air was about 50°.

Experiment 10.—The imported oil from Batavia (No. 1) gave by cold admixture 10·2 oil + 9·8 alcohol; by warmth and subsequent deposit, 10·1 oil + 9·9 alcohol.

Experiment 11.—Imported oil (No. 2 sample) gave by agitation without heat 10·2 oil + 9·8 alcohol; after heating and separation, 10·1 oil + 9·9 alcohol, being the same as experiment 10 on No. 1.

Experiment 12.—The specimen of old oil from Mr. Quincey yielded by agitation an opalescent or milky solution, which did not exhibit any signs of separation.

Experiment 13.—The English expressed oil from Messrs. Horner, by cold admixture and standing gave 9 of oil + 11 alcohol; after solution by warmth and repose 8·9 oil + 11·1 alcohol. The temperature in this case was about 60°.

I then made a few experiments with alcohol of ·794 sp. gr., with the following results:—

Experiment 14.—The imported oil from Batavia gave, by agitation, without heat, 9·3 volumes oil, + 10·7 alcohol. After solution by warmth and subsequent deposit 9·4 oil + 10·6 alcohol. Temperature 56°.

Experiment 15.—Horner's English expressed oil, by cold agitation, yielded 8·8 of oil + 11·2 alcohol. After dissolving by heat and standing, 8·7 oil + 11·3 alcohol.

Experiment 16.—The imported oil was again tried, but increasing the volumes acted upon to double their previous quantity, when it gave by the cold operation 9·9 of oil + 10·1 of alcohol; after solution by heat and separation, 9·9 oil + 10·1 alcohol. Temperature 58°.

The results, from the experiments Nos. 14 and 16, were placed in the same bottle, and it was found that the oil entered into perfect solution at 75° Fahr. At 70° the solution became opalescent, but without any separation. But at 67° a complete deposition of the oil took place.

What conclusions now can we deduce from these results? My own opinion is that freshly expressed croton oil, or rather, I should say, *oil* expressed from *fresh seeds*, either abroad or in this country, does not dissolve in alcohol having a specific gravity from ·794 to ·796, to a greater extent than twenty per cent. at the temperature of 50°; but that if croton oil has undergone a chemical change, such as resinification or oxidation by time and exposure to the air, as in the old oil of the above experiments, or has been freshly expressed from seeds which have become changed in the same manner, then the oil is dissolved freely by the alcohol, as shown above and in the experiments of Dr. Pereira, which I consider therefore must have been made with croton oil, freshly expressed it is true, but from seeds which had undergone a chemical change; and this accords with his own deductions from his experiments. At the same time I cannot but consider that a *test* which is open to so many weighty objections, both from the influence of small fluctuations of temperature, and for indicating the purity of a material liable to such marked differences from the effects of such natural and in some cases inevitable chemical changes, is perfectly useless as a reliable indication of purity.

NOTE ON MR. WARINGTON'S PAPER, ENTITLED "ON THE USE OF ALCOHOL AS A TEST FOR THE PURITY OF CROTON OIL."

BY PROFESSOR BENTLEY.

In the above paper I am accused of having in the 'Pharmaceutical Journal' *severely criticized* in rather *strong terms*, the "test" given in the 'British Pharmacopœia,' for "English Croton Oil." What the author means by *severely criticized* in rather *strong terms*, I am at a loss to conceive, as I simply stated the results which had been obtained by experiment (at least, in all their essential particulars) by Pereira and Redwood, and which were commonly received by scientific men, and published in all works treating of Materia Medica up to the publication of the 'British Pharmacopœia,' in January, 1864.

The test given in the 'British Pharmacopœia' for "Croton Oil expressed from seeds in England" is, as follows :—"Agitated with its own volume of alcohol, and gently heated, it forms a clear solution, from which about three-fourths of the oil separates on cooling." In commenting upon this test, I stated in the numbers of the 'Pharmaceutical Journal' for February and April last, that "This test is about true as regards East Indian croton oil, but it is not true with English croton oil, which is wholly and readily soluble in alcohol, and the solution thus formed is permanent at ordinary temperatures." In remarking upon this criticism, Mr. Warington says, "I presume that these statements, from their general context, are derived from the results published by Dr. Pereira in 1850. But if it is so, how is it that they are *not concordant with those results!*" and he afterwards adds, "such statements should surely have been carefully examined into *before they were put into print*." Mr. Warington then quotes some experiments of Dr. Pereira's which indicate, that when equal volumes of alcohol and East Indian croton oil are agitated with a gentle heat, the resulting mixture after being allowed to stand for two days, showed the oil had increased nearly one-tenth in volume. Now it is quite true that my remarks were founded, to a great extent, upon the results obtained by Dr. Pereira, but not wholly so, for during the last twelve years I have examined several specimens of East Indian croton oil, and have always found them to vary in their relations to alcohol. Indeed, Dr. Pereira himself states in his 'Materia Medica' that "according to Dr. Maclagan, only ninety-six per cent. of the oil separates. It is obvious, therefore, that commercial croton oils believed to be genuine, are not uniform in their relation to alcohol." When such conflicting results are obtained from operating upon different specimens of East Indian croton oils, I cannot admit that I was much in error in the statement I made in the 'Pharmaceutical Journal,' but, on the contrary, I believe that an extended series of experiments with ordinary commercial specimens of East Indian croton oil examined without reference to age or temperature, will show that the term employed "about true" is practically correct. I would further ask, is the botanical source of all specimens of East Indian croton oils so absolutely certain as to enable us to say positively that they have all a common origin, and hence accordingly to be expected to yield similar results with alcohol?

But the question as regards the relations of East Indian croton oil to alcohol, whether true or not, is altogether unimportant, so far as the test of the British Pharmacopœia is concerned, for my criticisms were not intended to supply a test for a non-officinal croton oil, but essentially to indicate that the test for the officinal "English croton oil" given in the British Pharmacopœia *was incorrect* according to the investigations of Pereira and Redwood. I may add also, as Mr. Warington regrets that I did not repeat the experiments, that the test was not in accordance with the results obtained by myself.

In reference to this test we will now quote Mr. Warington, as follows:—"It may be asked, and very properly (he says), how does this subject interest me? and how come I to take it up? The case stands thus:—In the month of *November*, 1863, at the time the sheets of the British Pharmacopœia were passing through the press, Dr. Frederick Farre, the London editor, requested me to try the test for the purity of croton oil given by the Edinburgh College in 1850, before introducing it into the text of the forthcoming volume. This was done with an oil taken from our own stock, and the result published in January, 1864, in the Pharmacopœia. This croton oil had been purchased in July, 1863, of Messrs. Horner, who, it is well known, press their own seed in London."

Mr. Warington here admits that from a single experiment upon one sample of oil *only*, and when the results obtained by him were entirely opposed to those previously published by Pereira and Redwood, the test for English croton oil was upon his authority and recommendation inserted in the British Pharmacopœia. With how much more care Dr. Pereira proceeded before he published the opposite results to those obtained by Mr. Warington will appear from the following extract from his 'Materia Medica:'—"This fact, which was mentioned to me by Mr. Redwood, he has verified with various samples of croton oil expressed respectively by himself, by Mr. Morson, by Messrs. Herrings, and by Messrs. May and Co. I have verified it with a sample expressed by Messrs. Herrings."

Mr. Warington then adds,—"On finding the published test, deduced from this experiment, so warmly criticised before the Pharmaceutical Society by one of their own professors, and the *truth* of my result so strongly questioned, I lost no time in repeating the trial, in order to satisfy my own mind on the subject." Mr. Warington then performed a number of carefully conducted experiments, and obtained the valuable results which he has given in his paper; these all tend to show that the solubility of English croton oil is liable to fluctuations, according to the length of time the oil has been expressed and the temperature at the time the experiments are performed; and he concludes as follows:—"I cannot but consider that a *test* which is open to so many weighty objections, both from the influence of small fluctuations of temperature, and for indicating the purity of a material liable to such marked differences from the effects of such natural and in some cases inevitable chemical changes, is perfectly useless as a reliable indication of purity."

It is much to be regretted that Mr. Warington did not try a similar series of experiments *before* he recommended the introduction of a test into the British Pharmacopœia, which he now admits is perfectly useless as a reliable indication of purity, *rather than afterwards*. "On finding the published test, so warmly criticized before the Pharmaceutical Society by one of their own professors." I will conclude by asking, who has made the *mistake* with regard to the test? *Is it the critic* who first called attention to its being entirely opposed to the published results of Pereira and Redwood? or *is it the criticiser of the critic* who recommended its insertion into the British Pharmacopœia on the strength of a solitary experiment? and who now upon further investigation admits that it is *perfectly useless as a reliable indication of purity?*

THE METHYLIC ALCOHOL TEST.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In the number of your Journal for December 1st, I see a letter from Mr. John Tuck, in which he ingeniously attempts to throw doubt on my statements regarding priority of publication of the mercurial test for "wood-spirit." In any previous communication I avoided making any special comments on the wholesale manner in which Mr. John Tuck has evidently appropriated the results of my previous investigation; nor did I at the time deem it necessary to do more than state a general case, without specially indicating the several dates of publication of my paper in the different periodicals. Mr. Tuck now lays hold of the latter point, and implies that since my paper on "wood-spirit" did not appear (*in extenso*) in the Pharmaceutical Journal until a month after he had sent his answer to the Conference, that, therefore, his claims to priority are at once proved. Unfortunately for Mr. Tuck, however, stubborn facts stand in the way of this hypothesis. The first is, that just eight months prior to November, 1863, my method of detecting wood-spirit was described and commented on in the pages of the 'Pharmaceutical Journal'; and the second, that on the 31st of January, 1863, a very full abstract was published in the 'Chemical News.' The paper appeared *in extenso* in July, 1863, in the 'Journal of the Royal Dublin Society' and in the 'Dublin Quarterly Journal of Science' for the same month, and in December, 1863, in the Pharmaceutical Journal. Surely this is proof enough.

I may observe here that the strictures which Mr. Tuck passes in his letter on the practical working of the test for wood-spirit described by me, apply with twofold force to his own slight modification of my principal test, since I employ two corroborative reactions, which he could scarcely have introduced in his paper on the subject without leaving him peculiarly open to remark.

Sufficient evidence has now been brought forward to substantiate the statements previously made by me; the aspect of the whole matter, therefore, remains the same as it was prior to the publication of Mr. John Tuck's elaborate report.

I am, Sir, yours respectfully,
EMERSON J. REYNOLDS.

Laboratory, Ledwich School of Medicine and Surgery, Dublin, December 19, 1864.

POISON PREVENTIVES.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—For a long time a discussion has been going forward relative to the protection of the public from mistakes in the administration of poisons, and numerous devices have been submitted to the Council, and chemists in general, for inspection, with more or less success; but by such proceedings do we not defeat our own ends?

I read in this month's Journal that a deputation of our most influential men waited upon Sir George Grey, in reference to a "Bill for Regulating the Qualifications of Chemists and Druggists," "as far as possible to enlist the interests of the Government in its favour;" and, a little further, I see that in public meeting assembled, the Vice-President as Chairman, brought under most distinguished notice an invention of Mr. Howell, for preventing accidental poisonings.

If after examination a mechanical preventive for mistakes is required, what need of examination at all? The touch of the bottle, be the contents whatsoever they may, ought instantly to evoke a train of thoughts as to the composition, properties, dose, etc., of the medicine; and it not only makes business a pleasure, but strengthens the mind for further exercise, requiring a ready knowledge of our art. He must have a shallow mind indeed who simply pursues the business of a chemist for the profit derivable therefrom, or, in its study, does not feel himself elevated above the mass, as he views with the eyes of a philosopher the wonders that crowd round his vocation.

It may be a small matter to some to serve *an ounce of salts*, but what an amount of instruction is that ounce of salts capable of affording! Discovered nearly two hundred years ago at Epsom, whence its name, and its nature not fully explained till the middle of the last century, it is now manufactured by hundreds of tons yearly. Its crystalline formation, its solubility, its decomposition by potash, soda, lime, etc., illustrating the great laws of Berthollet, the fact that there are two cases of poisoning by this salt on record, and that, strange to relate, no purging occurred in one,—all tend to make this trivial circumstance the subject of deep thought.

Accidental poisoning arises either through carelessness or incompetency. If a man *can* be careless in dispensing when a fellow-creature's life depends upon his careful manipulation, is it not making him more thoughtless still by placing within his reach some fancied security? A man is not supposed to dispense as if in a dream, but to concentrate all his energies upon the business in hand. These remarks are equally applicable to mistakes over the counter, as the substitution of *oxalic acid* for *salts;* and the cure is to be found not in a rough wrapper or a pricking cork, but in the elevation of the man. This is to be accomplished mainly by the master instructing his apprentice, not in the "dull routine" of business alone, as is too often the case, but in the scientific part of his calling as well, and as the young man is trained to observation and exactness, so will the seeds of carelessness be early eradicated, and with the individual advancement the body collective will progress.

Some prefer an assistant unconnected with the Society, but such notions as cause this preference are fast dying out before the acknowledged superiority of its members. They imagine that by keeping his mind solely upon the pounds, shillings, and pence, he makes a much better man of business; but in such cases there is simply a business, and nothing more; they dispense with the same indifference as a grocer weighs his tea,—it is nothing more than their trade. We have all a tendency to fall into this dilemma, but it is science that saves us, and tells us from every "bottle of physic there is a lesson to be gained as well as a remuneration." Much more might be said upon this subject, but with the hint I leave the matter in abler hands.

I am, Sir, your obedient servant,

E. W. Barnett.

THE NEW PHARMACY BILL.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I have received a copy of the Pharmacy Act, 1865, and as Local Secretary have obtained the signatures of all the druggists in the locality, with one exception, to the epistle, recommendatory. I like the Bill in many respects, but I think it should specify the kind of examination to be passed by future druggists. The tendency of a board of examiners in London or other large town, elected principally by retail druggists, would be twofold:—First, to make the examination as stringent as possible, so as to reduce the number of druggists;

and second, to render a lengthened period of study in London or elsewhere imperative, under the pretence of keeping up Schools of Pharmacy.

Now, unless the first is guarded against, the Legislature will hardly pass the Bill. I should like to see some specification as to what really will be required of future druggists, and that nothing be included therein which will not tend immediately to ensure proficiency in pharmacy. All we want is to have those as druggists who can read prescriptions, dispense, make, and identify the Pharmaceutical preparations, detect adulterations, and have a knowledge of the doses and effects of the articles they deal in. These things can be stated, and they are such as the Legislature will be likely to grant.

Then, as to the second. Centralization would tend to the injury of country druggists: those, be it observed, from whom the principal support of the Pharmaceutical Society is obtained. Now, many a druggist looks forward anxiously to the time when he will have a vacancy for another apprentice, so as to receive the premium, and the training he can give him has been hitherto sufficient to enable the youth to start in business. But should it be found by-and-by that further study and attendance at lectures is required, those who are in the neighbourhood of such schools will have a mighty advantage with parents and guardians over others less favourably situated. It would be suicidal for country druggists to advocate such a scheme. But make the examination such that an ordinary druggist can, if he takes the trouble, prepare his apprentice to pass it, and I think the Bill will deserve and secure the support of all.

I am, Sir, yours obediently,

Weymouth, December 8, 1864. THOMAS BARLING.

[Our correspondent in the above letter seems to have overlooked the second clause of the proposed Bill, wherein it is provided that those who pass the examination (the "Minor"), which entitles them to be registered as "Assistants" under the Pharmacy Act, shall be also entitled to be registered as Chemists and Druggists under this Act. The subjects of that examination are stated in the Pharmacy Act, and the regulations of the Board of Examiners are in the hands of every member of the Society; they so completely coincide with—neither falling short of nor exceeding—Mr. Barling's requirements, that we think they must have his entire approval.—ED. PHARM. JOURN.]

Alleged Poisoning by Strychnia.—The case of alleged poisoning by strychnia, at York, mentioned in our last number, turns out to be no mistake at all on the part of Mr. Hardman's porter, but merely the result of an excessive dose of morphia. Dr. Porter made a *post-mortem* examination and an analysis of the contents of the stomach, and the result was that no poison was found, excepting morphia, which, as was well known, the deceased had been in the habit of taking in large doses. The verdict was, that death was caused by fatty degeneration of the heart, accelerated by an overdose of morphia, taken voluntarily.

Fatal Explosion of Oxygen Gas.—On Saturday night, December 17th, in Manchester, the bursting of a retort in which oxygen gas was being generated killed the operator and his son, aged two years, severely injured his wife, and destroyed the room and its contents in which the explosion occurred. Mr. Samuel Crowther, formerly and for some years property-master at the Theatre Royal, Peter Street, carried on business as a photographic artist, and dealt largely in gases used for the production of the oxy-hydrogen light. On this occasion the gas was being made from chlorate of potash and binoxide of manganese; and these materials, it appears, were obtained from Mr. Hughes, chemist, Cateaton Street. An inquest on Mr. Crowther and his son was held on Tuesday, December 20th. Professor Roscoe examined the manganese, which contained twenty-five per cent. of pulverized coal or soot, which, he said, would render it, when mixed with chlorate of potash, as dangerous as gunpowder. The jury returned a verdict of "Manslaughter" against Mr. Hughes, who was committed for trial, but afterwards admitted to bail.

BOOKS RECEIVED.

The Philosophy of Health; or, an Exposition of the Physiological and Sanitary Conditions Conducive to Human Longevity and Happiness. By Southwood Smith, M.D. Eleventh edition, revised and enlarged. London: Longman. Green, Longman, Roberts, and Green. 8vo. pp. 395. 1865. (From the Publishers.)

Therapeutics and Materia Medica. A systematic treatise on the action and uses of medicinal agents, including their description and history. By Alfred Stille, M.D., etc. etc. Second edition, revised and enlarged. In 2 vols. 8vo. Philadelphia: Blanchard and Lea. Trübner and Co., Paternoster Row.

TO CORRESPONDENTS.

Proposed Revision of the Medical Act.—"We ('Lancet') have authority for stating that it is the intention of the Medical Council to undertake a complete revision of the Medical Act."

Persons having seceded from the Society may be restored to their former status on payment of arrears of subscription and the registration fee for the current year.

Those who were Associates before the 1st of July, 1842, are privileged (as Founders of the Society) to become Members without examination.

Wanted.—Copies of the 'Pharmaceutical Journal' for May, June, July, and August, 1852: full publishing price given. Address, Mr. Bremridge, 17, Bloomsbury Square, W.C.

Pemb.—Yes, the two preparations are identical.

Howell's Safety Poison Capsule.—We are requested to state that the "Safety Poison Capsule," referred to in our last number, is the invention of Mr. Thomas Howell, of High Street, Camden Town.

W. X. Y. (Pembroke Dock).—The subject is not within our province.

H. V. (Dorking).—Of the formulæ sent to us, "No. 1" should form a bright solution. In "No. 2," the phosphate of zinc is only partly dissolved, the remaining portion subsiding when the mixture is allowed to stand for a short time.

A Birmingham Associate will find from the pages of this Journal, that an Association at Birmingham, similar to the one proposed, was maintained for several years, but was allowed to fall into abeyance. In 1860 an unsuccessful attempt was made to revive it. Should the attempt again be made with the "will and determination" alluded to by our correspondent, we hope for a better result.

S. J. F. (Bradford).—The languages of India are as numerous and distinct as those of Europe. We cannot tell what book will meet your wants.

A Young Student (Brighton).—Bentley's 'Manual of Botany.' The Lectures on Systematic Botany will be commenced about the middle of May.

Pharmaceutist (Liverpool).—See papers "On New American Remedies," by Professor Bentley, in the last three volumes of the Pharmaceutical Journal. Papers will shortly appear on "Leptandra," "Veratrum viride," etc. These have been unavoidably postponed, from the great press upon our space, arising principally from the appearance of the British Pharmacopœia.

Mr. Whitfield (Scarborough) and *Mr. Holloway* (Sydenham) are thanked for their communications.

Erratum.—Vol. VI. p. 21, line 20 from bottom, for "two fluid ounces," read *two fluid drachms.*

Instructions from Members and Associates respecting the transmission of the Journal before the 25th of the month, to Elias Bremridge, Secretary, 17, Bloomsbury Square, W.C.

Advertisements (not later than the 23rd) to Messrs. Churchill, New Burlington Street. Other communications to the Editors, 17, Bloomsbury Square.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VI.—No. VIII.—FEBRUARY 1st, 1865.

PROGRESS MADE WITH REFERENCE TO PHARMACEUTICAL LEGISLATION.

We alluded last month to the satisfactory progress then made in testing the opinions of chemists and druggists throughout the country with reference to the proposed new Pharmacy Bill of the Pharmaceutical Society, and the additional returns which have since been obtained enable us now to give a tolerably accurate indication of the feelings of the *trade* on the subject of pharmaceutical legislation. It could not be expected that any measure, likely to be sanctioned by the Legislature, would meet the views of all the members of a body such as we represent. The unanimous expression of a favourable opinion might in such a case be ascribed to indifference rather than the exercise of intelligent thought, and the formation of a settled judgment. That differences of opinion are expressed proves at least that attention is given to the subject; and the warmth sometimes manifested in discussion, and even the firmness with which views are maintained that do not coincide with those of the majority, may be favourable symptoms of the existence of a deep interest in the cause at issue, and of the exercise of vigorous intellect in its prosecution.

The "Bill for Regulating the Qualification of Chemists and Druggists," which has been drawn and proposed by the Council of the Pharmaceutical Society, has of course received the assent of that body; but it is not to be inferred from this that it comprises all that might be desired by those even who are its promoters and warmest advocates. In going to Parliament, it is necessary to consider what is practicable as well as what is desirable; moreover, in our case, it was necessary to consider the influence of the proposed measure upon those immediately and most sensibly affected by it, and to cause among such as little alarm and opposition as possible.

The result of canvassing the trade in all the principal towns shows most clearly that the Council have acted with much judgment in the construction of their Bill, as a very large majority of those to whom the appeal has been made have signed the declaration in its favour. We referred last month to Canterbury, where the declaration was signed by every chemist in the place. We may now add to the list of places where all have signed, Berwick, Forfar, Richmond in Surrey, Kilmarnock, Thirsk, Narberth, Gloucester, Warminster, Rugby, Leominster, Dover, Sandwich, Deal, Walmer, Barnsley, Bedford, Whitehaven, Ruthin, Leighton, Gosport, Salisbury. Then, at the following places, all but one have signed:—Nottingham (68 signatures), Oldham, Darlington, Torquay, Ashton-under-Lyne, Stourbridge, Margate, Poole. In the following all have signed but two:—Swansea, Ramsgate, Rochester, Reigate, Norwich, Birkenhead, Stroud, Cardiff. At Halifax, 22 have signed out of 25; at Southampton, 13 out of 19; at Ipswich, 11 out of 16; at Bath, 20 out of 30. From Hull the final return is not yet received, but the Local Secretary says that he has already obtained thirty signatures and will have many more. The Local Secretary at Liverpool states that he has already obtained 180 signatures, and expects about 25 more; while the whole number of druggists in the place, after deducting widows, absentees, etc., does not much exceed 220. We might add a further considerable list of places where the majority have signed, and we have, on the other hand, but a small number of places where the majority have refused to sign. In these latter instances the reasons given for such refusal are often founded upon a misapprehension of the effects the Bill would produce if passed into law. Some think the Bill would legislate only in favour of London druggists, and ask why druggists in the country are to be injured, as they would be, if village shopkeepers were prevented from selling medicines in common use. Of course, we can only say, in answer to these objections, that we are not aware of any provisions in the Bill that would operate more favourably for those living in London than for those in the country, and there certainly is nothing that would prevent country shopkeepers from selling ordinary domestic medicines, which we are aware are frequently supplied to them for that purpose by chemists in the neighbouring towns. A free discussion of the subject will tend to dispel such erroneous notions as these, and to remove prejudices which are found to prevail in certain localities, and to militate against the expression of the favourable opinion which in most other instances appears to be entertained.

Among those who have carefully analysed the Bill and well considered its provisions, there are two classes of objectors; those, on the one hand, who think it is not sufficiently liberal, and who would propose to put all existing druggists upon an equal footing, cutting off at once from the Pharmaceutical Chemist the advantage he derives from his past exertions and present position; and those, on the other hand, who think it is not sufficiently restrictive, because it leaves the sale of drugs and medicines that are not compounded from the prescriptions of medical practitioners just as it exists at present. The Council, happily have taken the middle course between these two extremes, and this appears to have met the views of a large majority of the members of the trade; for it must be observed that the appeal has been made, not merely to Pharmaceutical Chemists, but to the whole body of chemists and druggists. We have much pleasure in referring to the reports—which will be found elsewhere—of meetings of the trade at Edinburgh, Liverpool, Nottingham, Southampton, etc. The statements made at these meetings, coupled with the returns to which we have just alluded, and those to which we referred last month, must surely convince the most sceptical that the Council of the Pharmaceutical Society, in the course they are pursuing with reference to this subject, have the confidence and support, not only of their own constituents, but of the bulk of chemists and druggists throughout the country. They have proposed a measure which it is believed is sufficiently stringent to effect what is contemplated in the elevation of the body of chemists and druggists to a standard of adequate qualification, and is at the same time free from any tendency to exclusiveness that would operate unjustly towards existing interests or in any way to the prejudice of the public. That the Council are actuated by a feeling of liberality towards those of their brethren who have hitherto held themselves aloof from the association with which the Bill originates, may be inferred from the resolution—which will be found elsewhere—relating to the examination of chemists who have been for some years established in business. The Council have surely done all that could be desired in justification of their impartiality; nor can we think that any further concessions could be made in the direction of liberality without detriment to the cause. But in some instances objections are urged against the Bill because it leaves the sale of drugs, even of dangerously poisonous drugs, unrestricted. We are even told that the restriction with reference to the dispensing of prescriptions is not sufficiently stringent, and that the objects of the Bill may be evaded by keeping a sort of Medical Hall, and having a dispensary at the back, so that a prescription presented in the front shop may be translated there, and the translation taken to the back shop to be dispensed. It is assumed that this might be done by an unregistered dealer in drugs, without violating the proposed law, which we do not for one moment credit; but even supposing that it were so, is the practice of pharmacy so lucrative, or does it in any way present such powerful inducements to its pursuit, that men would be found resorting to a despicable subterfuge to enable them to enjoy the benefits which legally-qualified pharmaceutists have some difficulty in appreciating? We do not even believe that the retail sale of drugs could be profitably conducted if separated from dispensing, unless it be under quite exceptional circumstances; but it is deserving of consideration whether this part of the Bill might not be improved by restricting the sale of a limited number of dangerous medicines which are applied exclusively to therapeutical purposes to the class of qualified men who are entrusted with the dispensing of prescriptions. This and some other questions relating to the sale of poisons may be expected to be fully discussed before the Bill is passed, if not before its introduction into Parliament. It was important in framing the Bill and submitting it in a tangible form to those who will be most immediately affected by it, and whose expressed opinions will have much weight with the Legislature, that it should contain as few debatable points as possible, and in this we think the Council have been eminently successful. If the body of chemists and druggists can agree, as we believe the majority do agree, to the provisions contained in this Bill, a great point in that respect is gained; and we are sure the Council is open to any feasible propositions for improvement that can be shown to be equally popular with the trade at large, and not less likely to be sanctioned by the Legislature.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *January 4th*, 1865,

Present—Messrs. Bird, Davenport, Deane, Haselden, Hills, Morson, Reynolds, Sandford, Savage, Squire, and Waugh.

The following Pharmaceutical Chemists were elected

MEMBERS.

Birmingham	Lucas, Joseph.
Bishopwearmouth	Dobinson, William Lewis.
Bootle, near Liverpool	Walker, Joseph.
Chester	Grindley, William.
Gateacre, near Liverpool	Holgate, Walter.
Glasgow	Taite, James.
Hendon	Goldfinch, George.
Hirwain	Sims, Joseph.
Howden	Saville, John.
Huddersfield	King, William.
London	Davies, William.
”	Hickey, Evan Lewis.
”	Hickman, William.
”	Jones, William.
”	Preston, Richard.
”	Rhind, William Waddell.

Merthyr Tydvil	Rees, Thomas.
Nottingham	FitzHugh, Richard.
,,	Shepperley, George.
Oxford	Upjohn, Henry C.
Pembroke Dock	Saer, David Protheroe.
Rochdale	Mercer, Thomas William.
Southsea	Rastrick, Robert Joseph.
Stowmarket	Simpson, Arthur Lankester.

Resolved—That in the opinion of this Council it is desirable to continue the separate examinations for persons already in business, irrespective of the proposed extension of the Pharmacy Act.

EXAMINATION, *January 25th*, 1865.

(Registered as Pharmaceutical Chemists.)

Booth, Samuel	London.
Guest, Edward Percival	Brentwood.
Holt, William Henry	Altrincham.
Hyslop, John Cahill	London.
Salman, Thomas	London.
Sloggett, Thomas Chubb	Plymouth.
Smith, Edward	London.

REGISTERED APPRENTICES.

Name.	Residing with	Address.
Davies, James	Mr. Wade	Oldham
Farries, Thomas	Mr. Forge	Driffield.
French, John	Mr. French	Chatham.
Limb, Thomas	Mr. Patterson	Stamford.
Marrison, George O. L.	Mr. Marrison	Launceston, Tasmania.
Mepsted, Edward J.	Mr. Chignell	Wingham.
Smith, John	Mr. Williamson	Scarborough.
Tate, Alfred Hornby	Mr. Williamson	Scarborough.
Taylor, William Gee	Mr. Chaundy	Oxford.
Wilcox, William	Mr. Dring	St. Neot's.

PHARMACEUTICAL MEETING.

Wednesday, January 4th, 1865.

MR. SANDFORD, PRESIDENT, IN THE CHAIR.

The following papers were read :—

NOTES ON THE CHLORIDES OF IRON AND THE METHODS OF MAKING SOLUTION OF PERCHLORIDE OF IRON OF CONSTANT STRENGTH.

BY J. ATTFIELD, PH.D., F.C.S.,

DIRECTOR OF THE LABORATORIES OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

Aqueous and spirituous solutions of perchloride of iron have long been, and still are, much used in medicine. But the processes commonly employed for the preparation of them have been stated to yield products of inconstant qualities,—products too weak, too strong, too acid, too basic, unstable or impure. I have therefore experimentally reviewed the various methods, and this paper is descriptive of the results obtained.

First Method.

Theoretically, the simplest method of forming a chloride of iron would be to bring together chlorine and iron, the two elements of which it is composed.

Practically, also, this is the simplest process, if a pure, crystalline, anhydrous, solid chloride be required ; for iron is inexpensive, and can always be had in the convenient form of nails, wire, etc. ; and chlorine is easily made by any one having a slight acquaintance with chemical manipulation. The two elements attack each other even in the cold, but if the iron be made hot, combination proceeds with great rapidity, the result being protochloride of iron, if the iron be in large and the chlorine in small quantity, or perchloride of iron, otherwise known as sesquichloride of iron, if a continuous current of chlorine be supplied. On the small scale, the following arrangement of apparatus may be employed :—Generate chlorine by gradually heating a mixture of hydrochloric acid and binoxide of manganese in a clean Florence flask, dry it by conveying the gas through a glass tube to the bottom of a wash-bottle containing strong sulphuric acid ; from this bottle let it flow through another glass-tube to the bottom of a second Florence flask one-third filled with small iron nails, and kept at a heat approaching redness by a spirit or gas-flame placed beneath. Under these conditions the perchloride of iron sublimes, and adheres to the upper part of the flask. If the operation be discontinued when about half or two-thirds of the nails have been acted on, the residual iron will be found to be compacted together by small micaceous crystals of protochloride of iron. The colour of the latter is yellowish-white, soon changing to light-brown in the air, while the perchloride forms dark-green iridescent scales. The temperature required for the volatilization of the protochloride is far higher than that for the perchloride, hence the condensation of the two salts at different parts of the flask, a circumstance which enables the operator to separate the one from the other by merely cracking off the bottom of the flask on which the iron and protochloride rest. This process is a demonstration of the facts that protochloride of iron is formed whenever iron and chlorine are brought into contact, and that perchloride of iron is produced by the action of chlorine on protochloride of iron. The apparatus is not the best that could be devised if the protochloride only were required, but is well suited for the production of perchloride. In the latter case it is not necessary to continue the current of chlorine until all the iron has disappeared, for the nails that are furthest from the end of the delivery-tube are not so rapidly attacked as those nearer, and hence towards the close of the operation there is a free space in the neighbourhood of the delivery-tube, and some of the chlorine escapes without acting on the iron. This circumstance, however, ensures the presence of free chlorine in the upper part of the flask, and consequently the freedom of the perchloride there from the least trace of protochloride. From half a pound to a pound of pure perchloride of iron can in this way be made in a Florence flask. Much larger quantities are produced with facility in a similar manner in more capacious vessels.

Properties of the Chlorides of Iron.—Perchloride of iron is seldom used in the anhydrous solid state either by the pharmaceutist, chemist, or medical practitioner ; it is usually at once obtained in a state of solution. Unless, however, the characters of the pure substance be studied, especially its behaviour with solvents, we cannot form a correct estimate of the efficiency of the processes for the preparation of the solutions. I shall, therefore, briefly notice some of the properties of the perchloride and also a few of those of the protochloride, as some of the processes for the preparation of solutions of the former involve the previous preparation of solutions of the latter.

Properties of the Perchloride.—Anhydrous perchloride of iron absorbs moisture from the air very rapidly. If a few crystals be exposed on paper they become liquid in a few minutes. Once dissolved in water, however, it yields a liquid which will probably remain unimpaired for any length of time, for I have specimens a year old, containing $40\frac{1}{2}$ per cent. of the salt,—similar, in fact, in strength to the solution of perchloride of iron of the British Pharmacopœia,—

and they are still unaltered. The statement made to the Pharmaceutical Society by Mr. Richard Phillips, jun., at the evening meeting of October 9th, 1844, and recorded in the 'Pharmaceutical Journal,' vol. iv. p. 208, that solutions of the anhydrous perchloride of iron in water readily decompose on exposure to air, is obviously incorrect; solutions of the protochloride do so decompose, and I can only account for Mr. Phillips's statement by supposing that protochloride was present in the liquids on which he experimented. When anhydrous perchloride of iron is dissolved in water to form a solution of the officinal strength just referred to, it has a specific gravity of 1·432 and contains 40·5 per cent. of the salt, or 58 parts of solid perchloride in 100 fluid parts of the solution. This statement of the strength was confirmed by several experiments and by quantitative analysis; it is very different to that given in the British Pharmacopœia. In order, however, to compare this pure solution with others of similar strength, but which are impure, and therefore differing in specific gravity and consequently in percentage composition, it may be conveniently described as a solution containing two ounces of metallic iron in ten fluid ounces, or twenty solid parts of iron in one hundred fluid parts of the solution. Solution of perchloride of iron is decomposed when boiled, hydrochloric acid being evolved. This is true whatever be the strength of the solution, and should be remembered by the chemist in using a neutral solution as a reagent in analysis, and by the pharmaceutist in evaporating the liquid with a view to concentration. Sometimes the oxide first precipitated again dissolves as the solution cools; this only occurs when much perchloride is still undecomposed, and is due to the solubility of oxide of iron in solution of the chloride. Anhydrous perchloride of iron is also readily soluble in ether and in spirit of wine, but the solutions are not stable; in the course of a week or so they become opalescent and some basic chloride of iron is deposited. The ethereal solution undergoes the same decomposition in a few minutes if it be boiled; and the alcoholic solution also, if it be heated under pressure. I find that a few drops of hydrochloric acid per ounce will prevent this decomposition. But perchloride of iron and alcohol or ether decompose each other in another way when long exposed to the influence of light, and the reaction occurs whether the alcoholic solution be pure or contain water. Under these circumstances two-thirds of the chlorine in the salt remain with the iron, forming protochloride of iron, while the remaining third combines with the carbon and hydrogen of the alcohol or ether to form a volatile liquid of pleasant taste and odour, and which probably contains chloride of ethyl and possibly chloride of ethylene ($C_4H_4''Cl_2$) and chlorinated derivatives of those bodies. The resulting almost colourless liquids were formerly officinal in the Pharmacopœias of North Germany, under the name of "Ethereal Spirit of Chloride of Iron" and synonymous titles. It would seem that this reaction commences when the mixture of perchloride of iron and spirit or ether is made, as the solutions soon acquire the odour alluded to. The only other fact concerning solution of perchloride of iron to which I would now draw attention is that it is entirely converted into solution of pernitrate of iron if long boiled with excess of nitric acid; it is also important to observe that solution of pernitrate of iron is similarly decomposed if long boiled with hydrochloric acid.

Properties of Protochloride of Iron.—Protochloride of iron also is soluble in water, alcohol, or ether, but the solutions are unstable in the air; they rapidly absorb oxygen, and yield a turbid mixture of perchloride and peroxide of iron. Aqueous solution of protochloride of iron is also partially decomposed on boiling, some hydrochloric acid escaping and oxide of iron remaining. But in addition to this action, I find that the protochloride itself volatilizes, in an undecomposed state, in the vapour of water during the evaporation of its solution; and does so to an extent that precludes the possibility of preparing a solution of definite strength if ebullition occur during manipulation. Finally, protochloride of iron is far less soluble in strong hydrochloric acid than in water.

Properties of a semi-spirituous Solution of Perchloride of Iron.—When the pure solution of perchloride above described is mixed with three times its volume of spirit of wine, a clear liquid of rich brown colour is obtained, similar in percentage of iron, water, and spirit, to the fluid dignified by the name of tincture of perchloride of iron in the British and other Pharmacopœias and in pharmacy generally. This aquo-spirituous solution of perchloride of iron is very unstable, the spirit exerting exactly the opposite influence to that it always should and generally does exert in tinctures. Alcohol is generally added to liquids to retard or prevent change, or is used as a solvent for substances insoluble or only partially soluble in water. Now perchloride of iron is perfectly soluble in water, and the solution is stable; for these reasons the addition of alcohol to such a solution when it is to be used in medicines is entirely unnecessary and should not therefore be practised. But when, in addition to these reasons for its exclusion, it is known that in the course of a few days it and the perchloride of iron so react on each other that the solution becomes turbid, deposits much iron, and is unfit for use in medicine, its exclusion becomes imperative. Compounders of medicine have hitherto made a mistake in placing a spirituous solution in the hands of prescribers of medicine. They should now prepare an aqueous solution of similar strength, and induce the latter to discontinue the use of the spirituous. Meanwhile, just as the rotten supports of a bridge may be strengthened by spurs and trusses, so the breaking up of tincture of perchloride of iron, due to the presence of the body which should itself prevent decomposition, may be prevented by the addition of certain chemical supports. The simplest and least objectionable of these is hydrochloric acid. As a result of many experiments, which I need not describe, I find that if not less than four drops of the ordinary hydrochloric acid be added to every ounce of this semi-spirituous solution of pure perchloride of iron, no decomposition occurs; at least I find no evident change after keeping such a solution for six months, though, doubtless, the other decomposition to which I have referred, namely, the formation of protosalt and a chlorinated ethereal body, has progressed to some extent.

I do not recommend this method of making a tolerably stable tincture of perchloride of iron; for a spirituous solution ought never to be used in pharmacy. I simply refer to it as indicative of the cause of that failure or success which most persons have experienced in attempting to make the tincture, and offer it as indicative of the object to be aimed at in preparing the tincture so long as medical practitioners continue to prescribe that liquid.*

Second Method.

With a knowledge of these properties of the chlorides of iron and their solutions, we may now examine other processes for making solutions of perchloride of iron of definite strength. The strengths to which I more especially allude are those already mentioned, namely, an aqueous solution, one hundred fluid parts of which contain twenty solid parts of metallic iron, and a spirituous solution, one hundred fluid parts of which contain five solid parts of iron. These are, respectively, Liquor Ferri Perchloridi and Tinctura Ferri Perchloridi of the British Pharmacopœia.

In the above method of making perchloride of iron from its elements, the chlorine was obtained from hydrochloric acid by the agency of binoxide of

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* Since the above was written I find that at King's College Hospital the tincture has for many years been discarded in favour of an aqueous solution of similar strength. Dr. Lionel Beale, F.R.S., says (Med. Times and Gaz., Jan. 14, 1865), "The composition of this solution is just the same as that of the tincture, except that water is used instead of spirit. It has been in constant use in our hospital for the last eight or nine years." Correspondents of the 'Lancet' have also, lately, advocated the employment of aqueous rather than spirituous solutions of perchloride of iron.

manganese and heat. If, however, the salt be required in solution only, two-thirds of the chlorine can be obtained from the hydrochloric acid without either heat or binoxide of manganese, and two-thirds of the necessary labour, as well as of the heat and manganese, are thereby saved. In this case the iron is at once placed in two-thirds of the total amount of hydrochloric acid required; in a few hours the hydrogen of the acid has been wholly displaced by the iron, and has bubbled or effervesced out of the liquid, escaping, in the gaseous state, into the air. The result is a solution of *proto*-chloride of iron; beyond this point iron will not decompose hydrochloric acid. The other third portion of the hydrochloric acid is then made to yield its chlorine as before, by heating with binoxide of manganese, and this chlorine, conducted into the solution of protochloride already formed directly from the acid, converts the protosalt into a pure solution of perchloride of iron. To make this solution of the officinal strength, rather more than two ounces of fine iron binding-wire are placed in a mixture of six-and-a-half fluid ounces of hydrochloric of sp. gr. 1·17, and three-and-a-half ounces of water (or seven fl. oz. of acid of sp. gr. 1·16 and three oz. of water), and the whole placed in a flask or bottle, or some other vessel from which gas can escape, without the solution being unduly exposed to the air. In the summer time decomposition is complete in less than a day, in winter the vessel must be set in a warm place; for this is an action in which the chemical force is much influenced by the force of heat. The carbonaceous residue of the iron and the iron not dissolved must now be separated as quickly as possible, by filtering the solution into a bottle, and then chlorine gas be passed into the liquid until the protochloride of iron is entirely converted into perchloride. This is ascertained by placing a drop of the solution in thirty or forty drops of water, and adding solution of ferridcyanide of potassium, which gives a dark precipitate of Prussian blue with protosalts, but only darkens the colour of the liquid if persalt alone is present: when, therefore, a dark-blue precipitate ceases to be formed, the reaction is complete. Towards the end of the operation the delivery-tube must be removed, the stopper placed in the bottle, and the contents well shaken occasionally, in order to aid the contact of the chlorine with the last portions of protochloride. More chlorine is required in this operation than is theoretically necessary, as a portion of each bubble passes up through the liquid and escapes before it and the protochloride have time to attack each other. Finally, excess of chlorine dissolved in the solution is got rid of by boiling the liquid. Here, however, the process breaks down. The last traces of chlorine are not removed till the ten ounces of solution have been reduced to eight, and during the ebullition much hydrochloric acid is lost. In appearance the product is excellent, but it is of course very basic.

Third Method.

The third process for preparing perchloride of iron to which I shall refer, is a slight modification of the one already described. It is that adopted by the compilers of the British Pharmacopœia. As in all the other processes, so in this, the required chlorine is obtained from hydrochloric acid. But the hydrogen of the acid is not removed either wholly, as in the first-named process, nor partially, as in the second, by the agency of binoxide of manganese and heat, but by nitric acid. Iron is dissolved in the requisite quantity of hydrochloric acid, two-thirds of which, as already described, loses its hydrogen in the gaseous state, and protochloride of iron is formed:—

$$Fe_2 + 3\,HCl = 2\,FeCl + HCl + H_2.$$

On the addition of nitric acid, the third portion of hydrochloric acid loses its hydrogen by the action of some of the oxygen in the nitric acid, and the liberated chlorine then combines with the protochloride of iron to form perchloride:—

$$HCl + O = HO + Cl;$$

$$\text{then } 2\,FeCl + Cl = Fe_2Cl_3.$$

Three-fifths only of the oxygen in the nitric acid perform this work, the other two still remaining with the nitrogen, and ultimately escaping in the gaseous form of binoxide of nitrogen from the vessels used in the operation. The whole reaction may be thus expressed:—

$$Fe_6 + 9HCl + NO_5 = 3Fe_2Cl_3 + 3HO + NO_2.$$

The binoxide of nitrogen arising from the portions of nitric acid first decomposed, dissolve in that part of the protochloride of iron not yet acted on, and orm a compound of dark colour; but when the solution is evaporated to a particular degree of concentration, or excess of some kind of acid is added, the black compound is decomposed, and the whole of the binoxide of nitrogen escapes. I may here state that I have satisfied myself that this is a true explanation of the chemical reactions which occur in the process. Yet the process will not yield, or only by chance yield a pure product. In the first place, an exact amount of hydrochloric acid must be used. Now, hydrochloric acid is a body which, chiefly from its character as a gas, cannot be conveniently employed in the pure state; it is always met with in commerce in the state of solution in water, and the strength of the solution is determined by the specific gravity; and if the specific gravity is not exactly what it should be, the resulting solution of perchloride of iron will be acid or basic to an unknown extent. This circumstance, however, may interfere with any process for the preparation of perchloride of iron, or indeed with any other operation in which a given bulk of aqueous hydrochloric acid is used. In short, the liquid commonly known as hydrochloric acid should never be employed in making solutions of exact strength, unless its specific gravity be previously ascertained,—a fact that very well serves to show how the simplest operations in Pharmacy require an amount of chemical knowledge and skill such as is not always possessed by the followers of that calling in the present state of the law of this country. Supposing, however, the acid to be of known strength, and the requisite amount for a given quantity of iron to have been correctly calculated, it must be diluted with water, and that water subsequently removed by evaporation. It must be diluted, or the iron will not wholly dissolve in the cold; the first portions of protochloride of iron formed, being only slightly soluble in the hydrochloric acid, crystallize on the iron, and thus prevent the acid from coming into contact with the metal; and the solution must not be heated, or protochloride of iron escapes. The amount of water necessary to keep the protochloride in solution is about half the volume of acid used, if that acid be of the sp. gr. 1·16 or 1·17. But the water having performed its office, must now be removed, for the action of the nitric acid on the hydrochloric acid and protosalt is only complete when the mixture is so concentrated that it has about the bulk of the hydrochloric acid originally employed: the black compound, otherwise so fugitive, is comparatively stable in neutral or only slightly acid solutions, and the binoxide of nitrogen which causes it only escapes from such solutions when they are concentrated to a syrupy condition. To get rid of this water, heat must of course be used; the liquid must be boiled. But, as we have already seen, solution of perchloride of iron is decomposed when evaporated at a boiling temperature. Here again, therefore, the process fails. The only means of preventing such a decomposition is to add more hydrochloric acid, a proceeding which has the additional advantage of facilitating the breaking up of the black compound, and thus of more speedily causing the total evolution of the binoxide of nitrogen. But we cannot know what amount to add. Slight differences in the rate or extent of evaporation greatly influence the evolution of hydrochloric acid from the hydrated perchloride of iron, and whether much or little acid must be added to make up the loss, we have no ready means of ascertaining. Nor can the solution of the iron in two-thirds of the hydrochloric acid and water be evaporated before the other third and the nitric acid are added; for in that case protochloride of iron escapes with the steam, and the resulting solution is weakened to a corresponding extent. In short, the process is practically a failure as a method of preparing a pure solution of perchloride of iron. If the presence of free hydrochloric acid in the solution is of no consequence, then the process is as good as any other ; in that case it is only necessary to add, say, one-fourth to one-sixth more hydrochloric acid than is necessary for the reaction ; the black compound is then easily decomposed, so also is any nitrate of iron that may have been formed ; excess of nitric acid is also got rid of, and, excepting the presence of free hydrochloric acid, the solution is all that could be wished. Such a solution must, of course, be termed "acid solution of perchloride of iron," and its acidity will be variable in amount. It would surely be better that the officinal solution should be pure ; prescribers could then order the addition of any quantity of acid they might desire or have no free acid present,—an alternative that could not be enjoyed if this or any other faulty process for the preparation of solution of perchloride of iron were permanently adopted.

Liquor Ferri Perchloridi, *B. P.*—Before leaving this, the third of the processes that I have alluded to for the preparation of perchloride of iron, it will be as well to notice the adaptation of it given in the British Pharmacopœia. To 2 ounces of annealed iron wire, or binding wire, a mixture of 10 fluid ounces of aqueous hydrochloric acid (of sp. gr. 1·17) and 5 fluid ounces of water is to be added in successive portions, the resulting evolution of hydrogen gas being assisted by the application of "a gentle heat." Assuming that the words "a gentle heat" have their usual meaning, namely, a temperature entirely at the discretion of the operator, and disregarding the injunction to add the diluted acid "in successive portions," the metal is simply placed in the liquid, and the whole set aside anywhere in the summer time, or in a warm place (say at a temperature of 80° to 100° F.) in the winter, until the whole of the iron is dissolved. The operation will generally occupy less than a day. The solution must now be filtered, to separate the carbon set free from the iron wire ; it is small in quantity by weight, but rather bulky, and if not removed would give the final product a dark-coloured appearance. By the way, the direction to filter has been omitted from the Pharmacopœia description of the process. A mixture of 6 fluid drachms of nitric acid (of sp. gr. 1·5), diluted with 2 fluid ounces of water, is then added to the solution of iron, and the whole reduced by evaporation from its bulk of about 18 fluid ounces to 10 fluid ounces. Now, contrary to what has been stated by several operators, this method of working has yielded in my hands a clear, stable solution of the proper rich brown colour, and containing no protosalt. I can only suppose that others have used weak acids or have applied too much heat in the first stage of the process, and thus lost acid. But, as I stated in the lectures which I had the pleasure of delivering before the members of the Pharmaceutical Society in the early part of last year, the resulting solution contains pernitrate of iron. Moreover, it is deficient in acid ; hydrochloric acid has been lost from some of the hydrated perchloride of iron during evaporation, and though the peroxide of iron formed may not be in sufficient amount to remain as a permanent precipitate, but is dissolved in the residual perchloride of iron, the solution, from the absence of free acid, soon reacts on the spirit of wine it may be mixed with to form the so-called tincture, and a solid basic compound of perchloride of iron separates, and, from its lightness, remains suspended in the liquid ; in short, the tincture is spoiled. With regard to the pernitrate of iron, its presence is due to the employment of more nitric acid than is necessary. Theoretically, 2 ounces of iron, or 875 grains, require 1711 grains of anhydrous hydrochloric acid and 281 grains of anhydrous nitric acid (NO_5). 1711 grains of anhydrous hydrochloric acid are contained in 9 fluid ounces and 6 fluid drachms of aqueous hydrochloric acid of sp. gr. 1·17 ; and 281 grains of the body NO_5 are contained in 4 fluid drachms and 18 minims of aqueous nitric acid of sp. gr. 1·5.* So, then, the Pharmacopœia directions include the use of a slight excess of hydrochloric acid, and nearly half as much more nitric acid as is theoretically necessary. The excess, and more too, of the hydrochloric acid escapes when the solution of perchloride of iron is concentrated by evaporation, and its place is supplied to some extent by the superfluous nitric acid. If, however, the excess of nitric acid were omitted, and its place not supplied by additional hydrochloric acid, the amount of peroxide of iron formed during ebullition would be too large for resolution in the residual perchloride. As before remarked, the Pharmacopœia adaptation of the nitro-hydrochloric process of preparing perchloride of iron is a failure, in so far as the production of an aqueous solution of pure perchloride of iron is concerned. I may state that by using the theoretical quantity of nitric acid and about an ounce more hydrochloric acid than is theoretically necessary, I have succeeded in producing solutions of perchloride of iron of the officinal strength, containing no nitric acid, but varying in the amount of hydrochloric in the products, and consequently producing, when mixed with spirit of wine, liquids which may or may not be stable. The action of the excess of acid is, as already indicated, to replace hydrochloric acid lost by evaporation, and to decompose excess of nitric acid.

Fourth Method.

The fourth process for preparing solution of perchloride of iron to which I shall refer is that of dissolving peroxide of iron in hydrochloric acid. This process has been extolled for its simplicity. Gentlemen knowing nothing of chemical manipulation could dissolve the oxide in the acid, much as they would dissolve sugar in water, and enjoy the self-satisfaction of having made their own preparation; forgetting that the peroxide had probably to be prepared from a persalt, and that the persalt had to be made from a protosalt by the agency of nitric acid, and that the process was therefore not very different from apparently more, but really less complicated processes. I should advise such persons to go one step further than getting their wholesale chemist to thus perform half the process for them, and they complete it; I should advise them to let the manufacturer perform the whole operation. For if manipulators should never attempt to make any hydrochloric solutions of definite strength unless they can ascertain for themselves the strength of the aqueous acid by taking its specific gravity, surely they should not endeavour to prepare perchloride of iron from two substances, of which aqueous hydrochloric acid is one, and the other a body of equally inconstant qualities, namely, the so-called peroxide of iron. If a purchased specimen of peroxide of iron be only what its name indicates, it will most likely be in such a physical state as to be insoluble, or only partially soluble, in hydrochloric acid. And if it be readily soluble in the acid, it will probably be a hydrated oxide of iron, containing an inconstant amount of water.† In adopting this process, therefore, an inexperienced manipulator is more likely to make errors than in any other. He will probably fail in making his solution of perchloride of iron, or, if succeeding, his product will probably either be so basic as decompose a few days after mixing with spirit, or so acid as to mislead or be condemned by the prescriber. Of course an operator having knowledge and

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* Data. $Fe=28; NO_5=54; HCl=36·5$. Aqueous hydrochloric acid of sp. gr. 1·17 contains 34·25 per cent. of anhydrous acid (Ure). Aqueous nitric acid of sp. gr. 1·5 contains 79·7 per cent. of NO_5 (Ure); 1 fl. oz. = 437·5 grains; 1 fl. drachm = 54·6875 grains; 1 minim = ·9114583 grain. The presence of carbon in the iron is not taken into account, an experiment showing it to exist only in the proportion of ·25 per cent.

† The last sample supplied to me for laboratory use by one of the most respectable of the London manufacturers, contained only 67 instead of 90 per cent. of oxide, the remainder being sulphate of ammonia and water. Even this badly washed and dried specimen was not wholly soluble in hydrochloric acid.

skill would produce a perfectly pure solution of perchloride of iron of definite strength from peroxide of iron and hydrochloric acid, for he would use only the hydrated peroxide, ascertaining its value by igniting a weighed quantity, and weighing the residue, and from these data calculating the amount of anhydrous peroxide in it; would determine the strength of the acid by its specific gravity; and finally, would mix the oxide and acid in such proportions as to ensure neutrality and exact percentage composition.* But even under those circumstances the solution could not be made of the officinal strength, for the requisite quantity of peroxide of iron increases the bulk of the strongest hydrochloric acid to an extent that necessitates subsequent concentration, and then, of course, hydrochloric acid is lost, the resulting solution is basic and decomposes on being mixed with three times its bulk of spirit to form the tincture. Obviously this is a difficulty that would not occur if a more dilute solution were required,—a solution, for example, of one-fourth the strength—of the strength, in fact, of the officinal tincture. Under any circumstances, however, the operator must make his own hydrated peroxide; so that, altogether, he would probably prefer the direct and, to him, less troublesome process of preparing his solution from the anhydrous perchloride.

Other Methods.

There are other methods by which it is possible to produce perchloride of iron, but they are of theoretical interest only, and therefore need not be noticed.

The process of the United States Pharmacopœia is similar to that of the British Pharmacopœia, except that an indefinite quantity of nitric is ordered; the nitric acid is to be added to the hot acid solution of protochloride of iron, until effervescence is no longer produced. The product will consequently contain much free nitric acid, for the black compound of binoxide of nitrogen and protochloride of iron is not decomposed in a neutral or only slightly acid solution.

Crystallized hydrated perchloride of iron, containing twelve atoms of water of crystallization, is sometimes ordered in prescriptions. It occurs in yellow masses having a crystalline structure, and is formed when solution of perchloride of iron is concentrated to a thick syrup, and set aside to cool. It is seldom pure, containing excess of acid or base, and varying somewhat in the amount of water it may contain. Being itself indefinite, it cannot be used in forming a definite solution.

Conclusion.

In conclusion, let me briefly recapitulate the chief points in the chemistry of the chlorides of iron to which I wish to draw attention. First, cold aqueous solutions of pure perchloride of iron are perfectly stable, and can be prepared of definite strength. Second, spirituous solutions, either wholly alcoholic or containing water, are unstable, and soon lose their definite character. Third, the presence of hydrochloric acid retards the decomposing reaction of perchloride of iron and alcohol. Fourth, no process for the preparation of pure solution of perchloride of iron is so simple as to be capable of performance without chemical knowledge and skill. Fifth, solutions of either of the chlorides of iron are partially decomposed on evaporation, and protochloride of iron is volatile in the vapour of water. Sixth, neither the process of the British Pharmacopœia nor that of the London Pharmacopœia yields a pure solution of perchloride of iron. Seventh, the method of producing solution of perchloride of iron by saturating hydrochloric with iron, and passing excess of chlorine through the resulting liquid, is faulty, because the excess of chlorine cannot practically be removed ex-

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* See a paper by Davenport, Pharm. Journ. 2nd ser. vol. iv. p. 362.

cept by ebullition, and ebullition causes decomposition of the solution of perchloride. Eighth, the only method of producing pure solution of perchloride of iron of officinal strength is to dissolve the anhydrous perchloride in water: say $5\frac{3}{4}$ ounces added to water, so that the solution shall measure 10 fluid ounces, and this solution then diluted to 40 ounces to form a solution of the strength of the tincture.

I beg to recommend the adoption of the last-mentioned process for the preparation of aqueous solution of perchloride of iron. It is perhaps the most expensive, requires a considerable amount of manipulative skill, and can only be performed in the open air or with appliances for carrying off the chlorine which escapes during the operation. Moreover, the great affinity of the salt for moisture must always be remembered and counteracted, either by packing it in bottles as soon as made, in quantities just sufficient to make half a pint, a pint, etc., of solution, or by dissolving it as soon as made (by adding it to water, not water to it), and making the solution, rather than the solid, the commercial form of the preparation.* All these circumstances are unfavourable to the adoption of the process, but it is the only one which will give a pure preparation. Finally, I distinctly deprecate the employment of a spirituous solution of perchloride of iron—the so-called tincture. It is true, as I have shown, that the tincture suffers no immediate and apparent decomposition if excess of acid be present, and there may be those who are of opinion that an acid spirituous solution of perchloride of iron is preferable to a mere aqueous one of similar strength, because, on keeping, a pleasant odour and flavour are produced. With such opinions I have no sympathy whatever. The therapeutist can employ chalybeates, acids, and flavouring bodies if he needs them, but, under the definite chemical name of one of them, do not give him all three. The art of healing can never make satisfactory progress until compounders of medicines place pure definite preparations in the hands of prescribers.

ON A NEW FORM OF OINTMENT OF STAVESACRE AND ITS APPLICATION IN CERTAIN CUTANEOUS DISEASES.

BY BALMANNO SQUIRE, M.B., F.L.S.

In the course of some researches into the pathology and treatment of the diseases of the skin, in which I have for some time been engaged, I have devoted especial attention to the investigation of one of the severest and most intractable of these affections,—one known as Prurigo senilis, or the "old man's itch." After having carefully examined a large number of cases of this disease, I arrived at the conclusion that it was essentially dependent on the presence of the pediculus corporis on the surface of the skin, and that all the phenomena of the disease were dependent on the irritation set up by the presence of this parasite. This coloured photograph, which I had taken from a case of Prurigo senilis lately under my care, conveys a fair idea of the general appearance presented by this disease. Up to that time Prurigo senilis had been supposed to be dependent, in some cases, on derangements of the digestive organs, in others, on disordered innervation of the skin. In such instances of the disease as had been noticed to be accompanied by the pediculus corporis, this parasite was supposed to be an accidental complication, in no way concerned

* This readiness to absorb moisture is greatly influenced by the state of aggregation. In the condition of powder or single crystals it certainly does take up water most greedily. But if after manufacture it be removed in lumps or masses of crystals, so that as little surface is exposed as possible, the rate of absorption is much reduced. 900 grains placed in an open wide-mouth bottle on a damp day only absorbed three grains of water in an hour. This amount was, however, sufficient to make the lumps look wet and spoil their iridescent appearance.

in the production of the disease. Having ascertained thus much, I from that time confined my treatment of the disease to the local application of the various substances known to be destructive to the lower forms of animal life. These are sufficiently numerous, but to a large number of them serious objections may be raised. Thus, without referring to more than two,—

Since the disease is spread most commonly over the greater part of the surface of the body, the use of mercurial ointment is not to be recommended.

Again, the nauseating odour and the irritating properties of turpentine render it equally ineligible.

In brief, I found the seeds of the *Delphinium Staphysagria* the safest, the pleasantest, and the most effectual remedy of many that I employed.

Even in cases where the disease had lasted for six or eight years, and the irritation occasioned by it had at length become so severe as entirely to deprive the patient of sleep for nights together, this remedy would cause it to disappear altogether, and that frequently in less than a week.

I mention thus much about the disease, in order to show the importance of what might else appear to be a very trivial question—the question of what is the best method of preparing Stavesacre for employment as an external application.

A way in which it is sometimes used is the sprinkling of the powdered seeds over the skin; this, however, I found a much less efficacious plan than its employment in the form of ointment.

The ointment that I had made for me was, however, a by no means satisfactory preparation.* You will observe that it has a measly, spotted appearance, that is anything but inviting; I thought this proceeded from carelessness in powdering the seeds, but was told they could be powdered no finer. On removing the bung of a bottle containing some of the powder, it was noticed that the paper that covered the cork was stained with grease spots, and this at once suggested the reason why the seeds would not powder any finer than the coarse meal-like substance that you see. The seeds evidently contained a considerable quantity of oil.

With a view of making a more elegant-looking ointment, I had all the oily matter extracted from a given quantity, by means of ether; and after this process, the meal-like matter was pounded afresh,—it readily broke into a much finer powder, this is some of it. And this powder, as might be expected, made a much more presentable ointment. Here is a specimen. But on employing this ointment in the treatment of the disease, I found that what I had gained in appearance I had lost in efficiency; the ointment so made was powerless as a therapeutical agent.

I then betook myself to the constituent that had been extracted in this process, viz. the oil, which amounted to as much as the half (by weight) of the seeds, and had an ointment made of this, adding a little white wax to it to preserve its consistency. The oil is a dark yellow, tolerably bland fluid; this made an ointment which, as this sample shows, is preferable in appearance even to the last. On employing this last ointment, I found it much more efficacious even than the one I had first used.

Another mode and a cheaper one of coming at nearly the same result, is to digest the crushed seeds in hot lard; this produces an ointment scarcely less efficacious than the one last described, but it has, as you may see, the disadvantage of being stained of a brown colour. I should not conclude this communication without mentioning that there is another disease of the skin, besides the one which first led me to this ointment, in which the same remedy may be most advantageously employed, and that is the disease known as Scabies, or the Itch, the coloured photograph of which now before you will give those who may not be familiar with its appearance a fair idea of it.

* Specimens of the differently prepared ointments were exhibited at the meeting.

DISCOVERY OF THEINE IN KOLA NUTS.

Professor Bentley said that he had been requested by Dr. Daniell to announce to the meeting that evening the important and interesting discovery of Theine in the Kola nuts of commerce (*Sterculia acuminata*). Dr. Daniell had written to him as follows:—"My attention was directed to the peculiar stimulant effects resulting from taking a decoction of the seeds, in the permanent loss of sleep, which led me to infer from physiological induction that these seeds contained an alkaloid analogous to theine, and on a chemical examination with a view to the discovery of that substance, I obtained a number of small, silky, needle-like crystals, which proved to be that alkaloid. On my arrival in England, I placed in the hands of Dr. Attfield samples of the fragments of the nuts, stating that they produced theine, and wished him to test the validity of my conclusions. I am happy to state he has fully confirmed my discovery." Professor Bentley added that Dr. Daniell would read a paper on the subject at the next Pharmaceutical meeting, and also that Dr. Attfield would at the same time give the details of his analysis of Kola nuts. Professor Bentley thought it probable that the alkaloid thus obtained, from the near botanical affinity of the genus producing it to that from which cocoa and chocolate were obtained, might be theobromine instead of theine, although the appearance of the crystals, it must be admitted, was more that of theine.

ON THE PURIFICATION OF ESSENTIAL OIL OF ALMONDS.

BY WILLIAM A. TILDEN,

DEMONSTRATOR IN THE LABORATORY OF THE PHARMACEUTICAL SOCIETY.

Among the numerous processes that have been suggested for the purification of essential oil of almonds from the prussic acid that it invariably contains, I believe there are none that are completely satisfactory, and some short time ago I was induced to make a few experiments in a new direction, with a view to finding a process for the purification of this essential oil that should not be subject to the objections to which the others are liable. Although I believe I have been to a certain extent successful, I wish merely to present some suggestions in order that some one who may have opportunities of working on a larger scale may, if so minded, repeat my experiments.

I have several times made use of a process founded upon a long-known reaction, and which consists in splitting up the hydrocyanic acid into formic acid and ammonia with the assistance of the elements of water,—

$$HC_2N + 2H_2O_2 = NH_3 + C_2H_2O_4,$$

this change being effected by the action of a strong mineral acid.

Now when this decomposition is brought about in the presence of hydride of benzoyl, the formic acid is not set at liberty, but unites with the elements of the hydride, producing a conjugate acid, to which the name formo-benzoylic acid has been applied.

Its composition is represented by the following formula:—$C_{14}H_6O_2, C_2H_2O_4$. This body is easily formed by boiling a mixture of the distilled water of bitter almonds and hydrochloric acid, sal-ammoniac being, of course, at the same time produced according to this equation—

$$C_{14}H_6O_2 + HC_2N + HCl + 2H_2O_2 = NH_4Cl + C_{14}H_6O_2, C_2H_2O_4.$$

I imagined that if the formation of this substance, this acid, which of course takes a large proportion of hydride of benzoyl, could be prevented or diminished, this might prove a practicable process for the destruction of the hydrocyanic acid in the essence of almonds. I have not succeeded, by any means that I have tried, in preventing altogether the loss of hydride of benzoyl in this form, but I think it may be effected to a considerable extent. The method I have pursued is as follows:—The essential oil is mixed in a flask with about three times its bulk of ordinary hydrochloric acid diluted with a small quantity of water, a condenser attached, and distillation started. As soon as the oil begins to come over pretty freely, a quantity of water is added and distillation proceeded with. The oil is afterwards separated from the aqueous portion of the distillate; it is slightly acid, and to remove this a little piece of quicklime is put into it, which at the same time helps to dry the oil. If hydrate of lime be used for this purpose, the essence becomes slightly discoloured.

Supposing the change represented in the equation above to take place strictly as there shown, a proportion of hydrocyanic acid in the oil amounting to 8 per cent would cause a loss of no less than 31·4 per cent. of the hydride, in the form of the acid described; 5 per cent. of hydrocyanic acid would remove 19·6 per cent. of hydride. Such a deficiency would be, of course, out of the question; but I have made in the manner described two rough quantitative experiments, and believe that the loss on the large scale would not amount to more than from 15 to 17 per cent., which would include hydrocyanic acid, benzoic acid, benzoine, and all the other impurities of the essence.

I now wish to describe another method, which was suggested at a meeting of the Chemical Discussion Association by my friend Mr. Broughton, and which had also occurred to myself, but at that time I had no opportunity of making the experiment.

Chemists have found that all the aldehyds with which we are acquainted form definite crystalline compounds with the alkaline bisulphites; hydride of benzoyl, possessing as it does the characters of an aldehyd, being, in fact, the aldehyd of the benzoyl series, is no exception to this rule.

If therefore the crude essence of almonds be shaken up with three or four times its volume of a tolerably strong solution of bisulphite of soda and then allowed to rest, the mixture becomes warm and the hydride of benzoyl is all converted into a crystalline mass, having the composition represented by the following formula,—$C_{14}H_5NaO_2, S_2O_4, 3Aq$. These crystals removed from the mother-liquor, which should be preserved, drained, and dried at a very gentle heat and then dissolved in water, carbonate of soda in excess added, and the mixture distilled, yield hydride of benzoyl in a condition of absolute purity. By this plan, theoretically speaking, there is no loss beyond the actual impurities of the crude substance. This is certainly a recommendation, but a little trouble is involved in the double operation of preparing the crystals and their subsequent decomposition.

Having obtained the purified essence of almonds by any process that is most efficient, another desideratum is felt in the difficulty of preserving it from undergoing that oxidation and change with which every one is familiar. By exposure to the air, as every one knows, absorption of oxygen occurs and the liquid hydride is converted into crystalline benzoic acid,—

$$C_{14}H_6O_2 + O_2 = C_{14}H_6O_4,$$

and this change proceeds much more rapidly with the purified than with the unpurified oil.

For this defect there is a simple remedy, which I think is as efficient as anything of the kind can ever be expected to be. It is well known that in the presence of moisture oxidation is effected with infinitely greater facility than otherwise. Numerous examples of this may be easily adduced, but I can remember none more striking than the formation of rust upon the surface of iron. If, then, the purified essence of almonds be perfectly dried by a lump of chloride of calcium introduced into it, the oxidation is retarded in a very marked degree. I cannot say that the essence attains the degree of permanence enjoyed by the crude substance, but certainly the improvement is of the most decided character.

Professor REDWOOD had been much interested in this communication, as it related to a subject on which he had himself worked, but with less satisfactory results than Mr. Tilden appeared to have obtained. It was easy to remove the prussic acid by means of oxide of mercury, and he had suggested this method some years ago; but a less expensive and more productive method was wanted, so that the purified oil might be supplied to the public at a price not much higher than that of the crude oil. It was also important, if possible, that the purified oil should be made as little subject to oxidation as the crude oil. It appeared that Mr. Tilden had been successful, to some extent, in the attainment of both these objects. His process for the purification of the oil was certainly a very promising one, and was likely to be generally adopted. Mr. Tilden seemed also to think that, by rendering the purified oil anhydrous, its tendency to oxidation was sufficiently lessened to remove the practical objection on this point; but it must be recollected that it was generally used as a flavouring agent in the form of essence, in which the oil was dissolved in spirit of wine, and, as the spirit contained water, this would probably destroy the effect of the previous drying. The more permanent character of the crude oil had been accounted for by supposing that part of the hydrocyanic acid, or cyanogen, existed in the crude oil in some state of combination with the oil; and if this be the case, probably hydrochloric acid or chlorine could be substituted, so as to produce an innocuous compound that would be equally permanent.

Mr. TILDEN remarked that the hydrocyanic acid which reappeared in oil of almonds, from which all the free hydrocyanic acid had been removed, was probably furnished by a decomposition of benzamide, which contains not cyanogen but its elements, and in this case the suggested remedy would not apply.

Mr. ALLCHIN thought that one of the most important points in connection with this subject was to devise an efficient method of preventing the purified oil from becoming oxidized, and thus losing its peculiar almond flavour. He had found this change to take place very rapidly in the spirituous solution, so that customers objected to purchase it when made with the purified oil.

Mr. HASELDEN was glad to find that so valuable a practical paper as this appeared to be was, like others they had received, a contribution from the class of Associates of the Society, and also that it emanated from that very useful association of young men called the Chemical Discussion Association, which met there once a month for the discussion of subjects relating to pharmacy, and the promotion of scientific research. He thought this association deserved to be more generally encouraged than it had hitherto been.

PHARMACEUTICAL SOCIETY, EDINBURGH.

A meeting was held in St. George's Hall, on Tuesday evening, 17th January at 9 o'clock; Mr. KEMP, President, in the chair.

After a few introductory remarks by the Chairman, the following paper was read:—"On the Present Position of Pharmacy in the United Kingdom, and on the teaching of Pharmacy in Edinburgh," by R. E. Scoresby-Jackson, M.D., F.R.S.E., F.R.C.P., Lecturer on Materia Medica, and Therapeutics at Surgeons' Hall.

Mr. President and Gentlemen,—I have much pleasure in availing myself of the opportunity you have afforded me of addressing you at one of your evening meetings. A lecture at this late hour, after the ordinary business of the day is closed, should be addressed, perhaps, to more than one of the drowsy senses, and I might have chosen for this occasion a subject that would have allowed of some display either by means of chemical manipulations, diagrams, or the exhibition of attractive specimens, so that by seeing and handling, as well as by hearing, a triple stimulus might be applied to the toil-worn brain. But I shall venture, without such aids, to ask your attention to a few simple but practical observations, the embodiment of thoughts which have for some time occupied my mind. For the sake of the younger students of pharmacy now present, I shall endeavour, in the first place, to show, in as few words as possible, the relation of their profession and trade to the physician* and the public; to show them what has been done by their predecessors for the advancement of pharmacy, and what is expected of them if they would improve the position already obtained for them. In the second place, I shall ask the attention of the senior members of the Society to a question, as it seems to me, of great practical importance relative to the teaching of pharmacy in Edinburgh. I shall be as brief as I possibly can in order to allow of time for discussion, and I hope the Society will gain far more advantage from the remarks which I trust will follow from some of the able Pharmaceutical Chemists, than could be expected from the reading of a single paper, however elaborate.

The physician and the pharmaceutist have a common interest in many things; and whatever tends to the development of the science and art of pharmacy, whilst it relieves the physician of many unnecessary cares, renders the practice of his profession at once more gratifying to himself and more profitable to the sick. The soldier is none the less brave or active because he does not forge his own weapons, but all the more formidable in the ratio of the excellence of his outfit. Nor is the physician less skilful because he does not prepare the materials essential to the pursuit of war against disease. The physician of the present day is far too heavily loaded with his multifarious 'ologies to desire the old encumbrance of pharmacy. Not an encumbrance in the sense of an antiquated and useless piece of machinery,—quite the contrary; for whilst the physician has been burying himself deeper and deeper in the mysteries of physiology, pathology, and therapeutics, the science and art of pharmacy, under the fostering influence of another school, has gradually advanced, and now presents itself in a form so intricate, and altogether so different from the operations and results of the *quondam* apothecary's shop, that the physician, when he compares the elegant and all-powerful materials now placed at his disposal, with the clumsy preparations of former days, is ready to admit that in point of scientific investigation as well as practical detail, pharmacy has passed beyond his reach. In truth, the physician and the pharmaceutist, although digging in the same mine, are working in opposite directions, and the more assiduously they toil, the further they get away from one another; but in the end they bring the results of their independent labours to a common level at the surface of practical application, and the patient gets the double benefit.

The pharmaceutist is the physician's best friend. There is nothing antagonistic between them. The old suit of *Dispensing Physician* v. *Prescribing Druggist* has worn itself out. The apothecary, in whom the two functions were united, has fallen into the past, and the general practitioner, sprung from the ashes of the former, has virtually conceded the rights and privileges, together with the labour and anxiety of pharmacy, to the scientific and practical Pharmaceutical Chemist. There are many physicians, it is true, who find it necessary or convenient to supply the medicines which they prescribe. But they merely obtain from the Pharmaceutical Chemist a sufficiency of drugs to answer the demands of a great number of prescriptions, instead of sending each prescription to the pharmaceutical laboratory. It is in the matter of *dispensing*, not of the *preparation* of drugs, that the relations of the physician and the pharmaceutist differ. In country districts, the physician *must* keep a stock of medicines; in towns the practice is not essential and is falling into disuse. But in all cases the *chemicals*, and in most cases the *galenicals* also, are in the first instance supplied by the Pharmaceutical Chemist, and often down to the very simplest formulæ.

It is now nearly a quarter of a century since British pharmacy assumed a respectable and responsible position. In the year 1841, a few of the leading chemists and druggists, in London and some of the provincial towns, realizing at once the general backwardness and helplessness of the disunited representatives of pharmacy, seized upon the floating reins of office, and by a firm but temperate hand gathered into one the disjointed members, and organized the now prosperous body known as the Pharmaceutical Society.

Before that period, it is true, pharmacy had been diligently studied, both as a science and art, by many talented and thoroughly competent individuals; and perhaps the real

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* I use the word *physician* throughout, simply for the sake of avoiding the longer terms, "Medical Man," "Medical Practitioner," "General Practitioner," etc.

difference between the pharmacy of the United Kingdom and that of Continental Europe and America lay rather in the systematic progress of the one and the individual and spasmodic efforts of the other, than in the aggregate knowledge of the subject as belonging to the several civilized nations.

Be that as it may, British pharmacy suffered by comparison, and it was not until, by the generous exertions of Jacob Bell and his able coadjutors, a union of the whole pharmaceutical strength of the country was effected, resulting in the publication of the *Pharmaceutical Journal*, and the establishment of a *School of Pharmacy* in London, that the pharmaceutists of this country could presume to stretch their hands across the Channel and the Atlantic to offer an interchange of ideas.

If before the incorporation of the Pharmaceutical Society, pharmacy struggled to maintain a position, and that with a measure of success, how much more rapidly has it since advanced! It cannot be pretended that the wonderful progress of pharmacy during the last twenty-four years is entirely due to the Pharmaceutical Society. Were there no other factor in the cause, the remarkable development of organic chemistry would alone demand a large share of the merit. But to a very considerable extent in its scientific and still more in its practical aspect, the present position of pharmacy in this country must be attributed to the Pharmaceutical Society. And who reaps the benefit?

First, the Pharmaceutical Chemist himself. Formerly, the druggist offered to the public no guarantee of respectability, whether in point of attainments or moral integrity. Some of them, we know, were men of science, chemists and druggists in the true sense of the terms, dispensers of trustworthy medicines. Of the rest, they professed to be chemists and druggists, but beyond the circle of their personal friends their intrinsic worth was unknown. *Now*, the Pharmaceutical Chemist holds a recognized position independently of his personal friends. He is guaranteed by a diploma conferred by the Society after a deliberate examination of the candidate's qualifications,—an examination rendered from time to time more searching in accordance with the multiplying facilities of education. He has risen through the grades of apprentice and associate to the rank of member; he has acquired a general knowledge of the sciences upon which pharmacy is founded, and has made himself familiar with the practical details of his art, and the commercial relations of his business. He is a man of unblemished reputation, holding a just balance between the physician and the public, neither presuming to fulfil the functions of the former, nor compromising his good faith by the character of the materials supplied to the latter.

Second,—The Physician. Taking for granted that the physician depends upon the pharmaceutist, if not in all cases for the dispensing of his prescriptions, at least in all for the preparation of his drugs, what an immense advantage accrues to him from whatever tends to improve the status and exalt the character of the Pharmaceutical Chemist! Can we imagine any disaster more appalling than deaths resulting through the inactivity of medicinal agents? When two trains come into collision, the crash is terrible and the cause obvious; when a gunpowder magazine explodes, devastating a whole district of country, the cause and effect are easily put in apposition; when a flaw in one of the many implements of war causes distress in its own instead of destruction in the enemy's camp, the cause is at once referred to the responsible manufacturer. In all these cases the miscarriage is patent to everybody, and the cause is seldom very obscure. And how easily do such accidents occur! so readily, indeed, that we often find them due to a poor underpaid wretched creature, who, when discovered, scarcely seems to be worthy of censure. But it is different with the preparation and administration of medicines,—a flaw in them it is not easy to detect. The constitution of the drug is often so complex, so little indicated by its physical characters, and so difficult to ascertain by chemical appliances, even if time and opportunity offered the means, that the physician is fain to hope without assurance that his instructions are faithfully carried out. The thousand-and-one agencies operating within and around the patient divide the responsibility with the dispenser of the prescription. And if the patient die, who shall determine whether the alkaloid, the extract, the pill or powder that might have saved him, was worth more than its weight of bread-crumb, if so much? Pharmaceutists know that it is the easiest thing in the world to spoil an alkaloid, or an extract, or a powder, or a juice in the preparation. One careless act, raising the temperature a little too high, or something as apparently trifling, will convert a pan-full of extract into a medicinally inert mass. And where is the physician's guarantee against these accidents, if not in the moral integrity and educational attainments of the pharmaceutist?

Third,—The Public. The safety of the public is to be found in the respectability of the pharmaceutist. The value of the drugs dispensed will vary according to the standard of character assumed by the vender. But I am not dealing with the question of morality, and therefore I need not refer to the abominable practice of adulteration, of dispensing old and useless, cheap and inert substances. I suppose it will be readily admitted that there are shops—for all druggists are not Pharmaceutical Chemists even now—where such trash is sold. It is said that the public refuses to pay remunerating prices, and that custom goes by cheapness; and this is held to be a sufficient excuse for fraud. Fraud is inexcusable. Pharmaceutical Chemists will surely deny this impudent assertion; they know that in a prosperous country the public will pay for the best of everything, and that it will pay for the best of drugs. The drug trade is doubtless undermined by ignorant and unscrupulous dealers, as much as the medical profession is by quackery, and it is very difficult to get rid of such mischievous parasites. Hitherto there has been no legislative measure capable of destroying them, nor is there likely to be any, for they are too wily and slippery to be easily held down by law. The remedy for both is in the hands of the physician and the pharmaceutist. Make a wide gap between respectability and knavery, so wide that the public can see the interval without spectacles, and depend upon it the public will discern and turn to the right side. It is sad to think how much the poor are cheated in more things than drugs,—heavy rents, dear and bad food, dear and scanty clothing. They pay a high rate for every comfort, or rather for every discomfort; and they often add to their misery, no doubt, by lavishing their slender means on useless physic. And yet they, if preference is to be given, should have the best of everything in their times of sickness, because with them time is capital, and whilst they are prostrate their business stands still. Hospitals are a great boon to them, and have a strong claim upon those who are able to support them.

From the highest to the lowest, then, the public reaps the advantages arising from the advancement of pharmacy, and it is no less the duty of the public than of the medical profession to second the untiring efforts of the Pharmaceutical Society. An opportunity now presents itself. The "Bill for Regulating the Qualifications of Chemists and Druggists" is to be presented to Parliament in the coming session. From the date of its operation, if it pass, as is to be hoped, no person will be allowed to commence business as a chemist and druggist for the dispensing of the prescriptions of medical practitioners without having passed an examination; or, in the words of the preamble:—"Whereas it is expedient for the safety of the public that persons carrying on the business of a chemist and druggist by retail, in the keeping of open shop for the compounding of the prescriptions of duly qualified medical practitioners, should possess a competent practical knowledge of such business, and to that end, that from and after the date herein named, all persons, before commencing such business, should be duly examined as to their skill and knowledge, and that a register should be established and kept of all such persons," etc. This measure the public, in its own interest, should support. That the medical profession will give weight to it is most likely. The 'Lancet,' in its opening article of the new year, points to this Bill as one of the prominent features of the medical year:—"The new year promises to bring forth a useful attempt at legislation in respect to pharmacy. The Bill originated by the Pharmaceutical Society deserves the support of the profession, and seems likely to meet with favour at the hands of the Government."

The present position of pharmacy in the United Kingdom may perhaps, then, be briefly stated thus:—first, that as a science it has rapidly advanced, and is now attaining a highly honourable rank in the circle of medical sciences; second, that as an art, it is remarkable for the elegance and utility of its productions, as compared with those of the earlier part of the present century; third, that with respect to those engaged in the study and practice of pharmacy, there is in the Pharmaceutical Society a combination of power capable of realizing the ultimate desires of the most ardent lovers of their profession; fourth, that with respect to the future of pharmacy, it is a matter of deep regret that there seems to be no prospect of the Government offering such facilities and encouragement for its prosecution as have been followed by most gratifying results in foreign countries.

If, then, the Pharmaceutical Chemist himself, the physician, and the public are all interested in the progress of pharmacy, they must be also interested in the means of its advancement, and especially in the question:—How is the standard of excellence, so essential to the reputation of the pharmaceutist, to the assistance of the physician, and to the safety of the public, to be attained? And the inevitable reply is, By suitable *Education.*

The cultivation of the pharmaceutical mind may be divided into three stages:—first, the education of the apprentice; second, the improvement of the associate; third, the maturing of the member; for, like physicians, pharmaceutists are but students at the close of their career, and through life those of equal advantages differ only in the experience of age.

I have only to deal with the first stage of education, that of the apprentice. One of the more prominent features in the operation of the Pharmaceutical Society is the encouragement given to the younger students of pharmacy. It is sometimes urged as an objection to pharmaceutical education, or rather as a plea for ignorance, that the office of a Pharmaceutical Chemist is merely to vend drugs already prepared by the wholesale dealers, and to dispense physicians' prescriptions, and that consequently, except for the few, many of the details of scientific and practical pharmacy would be an unnecessary tax on the mind as well as the pocket of the student. This is not the advice given by the Pharmaceutical Society; every now and then we read able addresses by the seniors to the juniors of the Society, urging them to prepare themselves by diligent study for assuming the functions and responsibilities of their calling, and for attaining that high position which merit alone can claim. It is not to be forgotten that pharmacy is a science as well as an art, or at least that it is an art founded upon several important sciences, and that the prosecution of pharmacy is a profession as well as a trade. The *Pharmacien* is a man of no mean position, and if the *Pharmaceutist* of this country has not yet attained the same parallel, it is all the more desirable that those who are now entering upon their calling should be so educated as to entitle them to it. It seems to me that there are few fields open to young men in which there are so many laurels to be gained. Those who have gone before, and many of those who are still occupying prominent and honourable positions in pharmacy, have been striving against the difficulty which attends all founders and reformers; they have had to dig through a surface of prejudice and apathy to seek a suitable foundation. But those who are now following in their footsteps will make their start in life from a higher platform, and it is for them to remember that although they have missed the privilege of working at the foundation of the building, it is still open to them to place the crown upon its summit.

And this brings me to the consideration of the teaching of pharmacy in Edinburgh. My remarks will apply equally, perhaps, to other large towns having medical schools; but I speak of Edinburgh more particularly, because, from the reputation of its medical school, the fact of its having in reality no school of pharmacy at all is somewhat remarkable.

Now, although it would be utterly impossible for the physician engaged in practice to pursue the study of pharmacy to such an extent as would keep that science and art *au courant* with the progress of the day, nevertheless it is essential to the due performance of his functions that he be generally well-informed concerning it; and in order that he may be able with facility to adopt the enlightened views of those who devote themselves entirely to the study of pharmacy, it is important that he should, during the period of his medical education, enjoy the opportunity of making himself acquainted with the subject. And such opportunity is, I think, fairly afforded. But the education that is sufficient for one who is subsequently to depend greatly upon others for his information, is scarcely enough for him who is to work out his own knowledge. If the medical profession is to relax its grasp of pharmacy, and let it fall entirely into the hands of the Pharmaceutical Chemist, it can only be on the distinct understanding that not only by opportunity in after life, but also by education, he is better endowed for the undertaking. The present teaching of pharmacy may be sufficient for the medical student, but I submit that it is inadequate to the wants of the pharmaceutical student; and I have no doubt whatever that, overwhelmed as he appears to be by strictly medical subjects, if an opportunity were offered of obtaining a higher knowledge of pharmacy, the medical student would also embrace it.

The art of pharmacy rests upon several sciences, the chief of which are chemistry and botany, not to mention zoology and mineralogy, which are of minor importance; and it is to be supposed that the student of pharmacy has enjoyed the advantages of a liberal scholastic education, including somewhat of natural philosophy. Materia Medica is an indefinite term, and instruction in that subject differs widely, according to the views of the teacher with respect to the relative value of the matters associated in his lectures. Sometimes pharmacy is the prominent feature in a course of lectures on materia medica, sometimes therapeutics, sometimes the physiological action, the *modus operandi* of medicines is dwelt upon, and sometimes dietetics and hygiene occupy a considerable share of the course; but chiefly these lectures treat of the drugs themselves, their origin, and their appearance and constitution, together with their actions and uses. Practical pharmacy is taught in the shops of Pharmaceutical Chemists and in the laboratories of our public dispensaries. I have now enumerated the sources from which the medical and pharmaceutical students draw their education, so far as it is common to both; but with this difference, that the medical student very rarely in the present day passes through, what to him would be a useless drudgery—a five years' apprenticeship to practical pharmacy; he is usually content with the practice of three or six months in a shop or at a dispensary.

The student, then, attends one or more courses of lectures on the following subjects, *chemistry*, *botany*, and *materia medica*, and he derives his knowledge of *practical pharmacy* from a shop or a dispensary; and with that course of study, *so far as it goes*, no one can find fault. But does it take the student far enough,—is it sufficient to make him a pharmaceutist? I submit that, as a general rule, it is not. We well know that there are exceptional cases of self-educated men who have attained the highest positions in their several callings, without the aid of lectures at all; but teaching is to be adapted to the capacities of ordinary minds. A very celebrated physician, Dr. Jenner, in speaking of his method of teaching the principles and practice of medicine, uses the following words:—"The time is short, the subject is long; for no general subject or special disease of pathological significance or of practical importance can be omitted. In such a course novelty seems to me out of place,—lengthened arguments in favour of this or that view, to occupy time which would be better employed in dogmatic teaching,—and the exposition of theories bewildering to the young student, who has so much to learn and so little time to acquire it." Omitting the words "or special disease of pathological significance or" this passage is equally applicable to chemistry, botany, and materia medica. Chemistry is a very long subject, and quite able to occupy the six months of systematic, and the three or more of practical teaching without pausing for a practical application to pharmacy. Botany requires its three months without the interruption of pharmacy, for its time is very short.

And now, let me dwell a little longer upon the course of lectures on Materia Medica. If pharmacy could be efficiently taught in a course of lectures on Materia Medica, I think it will scarcely be denied that Edinburgh would have one of the first schools of pharmacy in Europe; for the names are few indeed that are held in higher reputation than than that of the distinguished professor of Materia Medica in our University. But, "The time is short, the subject is long." I take the first volume of Pereira's 'Elements of Materia Medica;' it opens at the name *Potassæ Nitras*, and I find that this substance is considered under the following heads:—history, natural history, production, properties, characteristics, composition, impurities, physiological effects (α. on vegetables, β. on animals generally, γ. on man), uses, administration, antidote; and this is not an example from which there are officinal preparations to be treated of. It would not be very difficult to find out whether, if Materia Medica were attempted to be taught as above, one second of time could, even in a six months' course of lectures, be devoted to each of the heads; and if not in six months, how are the three months' courses to get over the ground? But it is not worth while to make the calculation. It is practically impossible to teach Materia Medica at such length, and therefore something must be left out, more especially if dietetics and private hygiene form part of the course. Then follows the question, what part of the subject is to be curtailed? and the reply has already been given; each teacher enlarges on the part of his subject which he considers of greatest relative value to the student. For my own part, I think that a sufficiency of pharmacy may be taught with Materia Medica for the medical student, but not for the pharmaceutical student, but I think also that the option of a higher pharmaceutical education should not be denied to the former when it is provided as a *sine quâ non* for the latter.

I shall not venture upon any observations with reference to the practical teaching of pharmacy in shops and the laboratories of dispensaries, further than this, that I think neither the medical nor the pharmaceutical student would be the worse of having even the simplest apparatus and operations explained to them by one who is thoroughly acquainted with their value. Nothing is more remarkable in a great mind than its condescension to little things; and there are few more striking examples of this than the instance of Professor Faraday writing his very simple but most valuable work on 'Chemical Manipulation,' a book whose object is to describe "The conveniences and requisites of a laboratory. General chemical apparatus and its uses. The methods of performing chemical operations. The facilities acquired by practice; and, the causes which make experiments fail or succeed." (Introduction p. 7.) To strengthen his view of the importance of small things, Professor Faraday quotes the following from Dr. Johnson:—"Nothing is to be considered as a trifle by which the mind is inured to caution, foresight, and circumspection. The same skill, and often the same degree of skill, is exerted in great and little things."

How, then, is the deficiency in the teaching of pharmacy to be supplied? First, it may be answered that the pharmaceutical student can wait until he has closed his apprenticeship, and afterwards take advantage of the school of pharmacy in London for additional scientific and practical instruction. But such a reply is objectionable, because it would imply the loss of five years at the most important period of life for instruction; and besides it would not afford the option of a higher pharmaceutical education to medical students.

Second, a school of pharmacy, on the same plan as the London school, might be suggested; but that would probably be found to be inexpedient, and, on the same scale, is perhaps unnecessary in Edinburgh.

Third, the institution of a chair of pharmacy in the University, endowed by the Government, is too much to hope for, and therefore—fourth, I would suggest that the students avail themselves, as heretofore, of the lectures on chemistry, botany, and materia medica; indeed, under any circumstances, I can see no necessity for removing these lectures to a school of pharmacy, but that, in addition, they be provided with a laboratory for scientific and practical operations, and attend a further course of lectures on the practical application of physics, chemistry, botany, and materia medica to pharmacy. The superintendence of the laboratory and the delivery of the lectures might be conducted by the same person, supported if necessary by laboratory assistants.

It is obvious that such a teacher of pharmacy must be independent of other work, and therefore neither a practising physician nor a Pharmaceutical Chemist engaged in business could accept the office; and possibly a little difficulty might arise as to the remuneration. But if the laboratory and lectures were not at first self-supporting, would it not be the duty of those who have been represented as interested in the progress of pharmacy—to wit, the Pharmaceutical Chemist, the physician, and the public—to lend substantial aid?

Mr. President, I now leave the matter in the hands of the meeting, and of the members of the North British branch of the Pharmaceutical Society generally. If it be thought desirable to provide greater facilities for pharmaceutical education in Edinburgh, I have no doubt you will, as a Society, use your powerful influence for making the necessary provision. For myself I have no personal interest in the matter, nor any whatever beyond a desire, common to us all, for the public and professional good; and having made these, I fear somewhat desultory remarks, it remains for me only to thank you for your kind attention, and to listen to your valuable suggestions.

At the close of the paper a long discussion ensued, in which Dr. James Young, Dr. Smith, and several members of the Society took part. All spoke in favour of the proposed Pharmacy Bill, and a feeling appeared to pervade all the speakers, that in event of Government passing the Amended Pharmacy Act this session, an impetus would be given to the teaching of pharmacy, which would be of the greatest service to Pharmaceutists as a body.

A vote of thanks was proposed by the chairman to Dr. Jackson, for his excellent and valuable paper, which was carried unanimously, and with acclamation. The meeting then adjourned.

PROVINCIAL TRANSACTIONS.

THE LIVERPOOL CHEMISTS' ASSOCIATION.

The Fourth General Meeting of the Association was held at the Royal Institution on Thursday evening, November 24th, 1864; the PRESIDENT in the chair.

The donations to the Library announced were 'The Chemist and Druggist,' 'The Pharmaceutical Journal,' and the 'Abstract of the Proceedings of the Liverpool Geological Society,' *from the respective societies.* A vote of thanks to the donors was passed. Mr. John Weightman, jun., was duly elected a member of the association.

The PRESIDENT exhibited a sample of Tinct. Camphoræ prepared with methylated spirit, the effect of which on the patient who obtained it was very undesirable. He considered that methylated spirits should not be employed for such purposes.

Mr. R. F. YOUNG laid specimens of Tinct. Ferri Sesquichlor., prepared by a formula different from that given in the B. P., before the meeting. He stated that he could not obtain a product according to the recipe in this text-book that would resist decomposition; and he attributed the defect to the fact that an excess of nitric acid was advised therein; that a sesquinitrate of iron was produced, and that this salt suffered decomposition after the addition of the spirit. The samples laid on the table were prepared with two-thirds of the nitric acid specified in the B. P.

Mr. JOHN ABRAHAM stated that the old compound Tinc. Ferri Perchlor. was very similar to that in the present work; he always found it kept well.

The SECRETARY considered that no sesquinitrate such as that indicated by Mr. Young was produced.

The Vice-President, N. MERCER, Esq., F.C.S., delivered the lecture of the evening, "On Nitrogen Compounds used in the Arts." At the conclusion of the lecture, which was highly interesting, a vote of thanks was moved to the lecturer from the chair, and the business of the evening closed.

The Fifth General Meeting was held on the 8th December, 1864; the PRESIDENT in the chair.

'The Technologist,' *from the Editor*, was announced, and the thanks of the meeting accorded to the donor. Mr. Thomas Williams was duly elected a member of the association.

The VICE-PRESIDENT explained the cause of the slow combustion which gun-cotton undergoes under certain conditions.

Dr. EDWARDS spoke on the same subject. In the absence of Mr. A. N. Tate, who was prevented from reading the paper of the evening by sudden indisposition, Dr. Edwards volunteered to give the history of a serious poisoning case in Wales, whereby several members of a family lost their lives. He exhibited some specimens of the arsenical indications obtained both on copper and in sublimate. He mentioned that arsenic was voided in the urine of one of the patients for several days, as indicated by the respective tests. He concluded his interesting address by dwelling upon the comparative merits of Marsh's, Reinsch's, and other arsenical tests. A vote of thanks to Dr. Edwards concluded the business of the evening.

The Sixth General Meeting of the Association was held on Thursday evening, January 5th; the VICE-PRESIDENT, in the absence of the President, occupied the chair.

The following donations to the Library were announced, and the thanks of the meeting awarded to the donors:—'The Pharmaceutical Journal,' for January, from the Society; 'The Technologist,' for January, from the Editor. The following gentlemen were duly elected members of the association:—Messrs. Charles Taylor, William Hughes, R. K. Jones, A. R. Arnott, and Thomas Huson.

The CHAIRMAN called upon Mr. A. N. Tate to favour the meeting with his lecture.

Mr. TATE proceeded with a very practical and comprehensive address "On the Refining of Petroleum."

A brief discussion followed, in which Messrs. Abraham, Bird, Betts, and others took part. A vote of thanks to the lecturer, moved from the chair and carried, brought the evening's business to a close.

LEEDS CHEMISTS' ASSOCIATION.

The Third Meeting of the Session was held in the Library of the Philosophical and Literary Society, upon the evening of December 14, 1864; the President (Mr. Haigh) in the chair.

Mr. Wm. Smeeton was elected a Member, and Messrs. Paine, Fowler, Wilson, Norrish, Dobell, and Ball were elected Associates.

Donations of Books to the Library were announced from Messrs. Barber, Church, Draper, Haselden, and Squire, for which the best thanks of the Association were voted to the donors.

Mr. R. Parkinson, Ph.D., of Bradford, (a Corresponding Member) read the paper of the evening, which was fully illustrated by apparatus and experiments.

By Volumetric Analysis is meant a system of analysis *by measure* as distinguished from the older and generally understood methods, in which the various constituents of the substance under examination are obtained in a separate form, and are then weighed. The distinction between the two methods may be also thus expressed:—in the older system, that of analysis by weight, or "the dry way," we endeavour to ascertain the quantity of material which *is produced* by any reaction, while in analysis by measure, or "the wet way," we generally take no notice of the material produced, but base our calculations on the quantity of reagent used *to produce* certain results. These by the laws of chemical combination are convertible terms, and in most cases convenience and simplicity are on the side of analysis by measure. Thus, in estimating the quantity of sulphuric acid present in any substance by the old method, we have to precipitate it by means of baryta, taking care only to add more than is absolutely necessary, then the resulting BaO, SO_3 is collected and weighed, and from its amount that of the SO_3 is calculated. By the newer method we take no notice of the quantity of BaO,SO_3 that is produced, but we carefully ascertain the quantity of Ba O that has been required to produce it. A slight variation in the calculation then brings us to the same result.

Although volumetric analysis has been much improved and extended of late times, yet it does not in many cases supersede the older methods, as there are certain conditions required for its use, and which are not always capable of fulfilment. Its principal advantage consists in the very much less time required for its operations than when the various substances have first to be separated in a convenient form, then washed or otherwise purified, dried, and finally weighed. Under the old system you have first "to catch your hare, then cook it," and finally dispose of the same, whereas, under the new, you may be said to eat your hare without either catching or cooking. As one instance of the saving of time by analysis by measure, I will suppose that we require to know the value of, that is the amount of iron contained in, a sample of iron ore. Under the old system we must dissolve the ore in HCl, filter, and precipitate the Fe_2O_3 by means of NH_3, collect this precipitate on a filter, wash till quite free from soluble matter (no easy task) then dry, and finally weigh. These operations will take the best part out of a day's work. Now, on the other hand, we dissolve in acid as before, boil a few minutes with zinc, dilute with water and add a solution of $KO\,Mn_2O_7$ until a red colour is produced. The amount of permanganate used will then (if the solution has been properly prepared and the quantity of ore taken be in correspondence) at once give us the percentage of iron. This can all be done in half an hour, or in an hour easily. Again, it may be required to know the alkaline value of a sample of soda ash, an article that often requires its true value finding. By the old methods, this could only be done by a very tedious process, while "alkalimetry," which is the name given to volumetric analysis as applied to the estimation of alkalies, will furnish the desired result in a few minutes.

Before proceeding with any of the manipulatory details, it will be well just to notice the principles on which the capabilities of volumetric analysis depend, a clear understanding of which is necessary to its intelligent appreciation, and without which it cannot be carried out successfully. Some branches of it are indeed so simple, that even the most ignorant may arrive at results, if supplied with materials and apparatus, with empirical directions for their use. Such must, however, always go in the same groove, and will be unable to rectify any error. Powers of this kind are worth very little; it behoves all, therefore, to make themselves acquainted with its principles, of which, perhaps, the first and greatest is the law of equivalents, or the law of combination in definite proportions, especially that part of it which is implied in the name "equivalent" or equal to,—that is, that a certain known quantity of every substance will combine with a certain known quantity of every other, capable of such combination. Thus 40 parts of SO_3, neither more nor less, will equally combine with and neutralize 31 parts of soda, or 28 parts of lime, or 17 parts of ammonia, and so on. Thus, if you know the quantity of sulphate of soda you have, you know exactly the quantity both of the SO_3 and the NaO that compose it; and also, if you know how much SO_3 you have in a quantity of $NaO\,SO_3$, you also know how much soda and how much sulphate. It would be out of place for me to dwell further on this part of the subject, it is doubtless familiar to many of you; a clear understanding of it is, however, of the greatest advantage. Another principle of Volumetric Analysis is that there must be some well-defined indication, evident to the senses, showing the exact termination of the various operations, thus enabling us to use only just so much material or reagent as is necessary to effect our object, and so to know exactly the quantity required. Thus, if we are decomposing soda ash by means of SO_3, we must be able to know the exact point when we have added enough acid to neutralize the soda. Various chemical reactions are taken advantage of with this view, such as the fact that acids turn vegetable blues (*e. g.* litmus) to red, while alkalies, on the other hand, restore this reddened litmus to blue; also, that iodine forms a blue colour with starch, ferrocyanide of potassium gives a blue with persalts of iron, ferricyanide a blue with protosalts of the same metal. Again, the commencement of formation of a precipitate in a clear liquid, or the cessation of production of a precipitate on addition of more reagent, are among the indications which, as I have said, are necessary. It is this necessity that limits in some degree the applications of volumetric analysis; as it is not in all cases that we can obtain this clear and well-defined mark of the end of the operation. New suggestions in this direction are however frequently being made. Another condition required in volumetric analysis is the possession of various solutions of a known chemical value, that is, that so much by measure contains a known quantity of the dissolved substance by weight. And again, we require intruments by which we can accurately and conveniently know how much of any of these solutions we have had to employ to effect our object. We will first describe the standard solutions. Strictly speaking, the actual strength of these is of no consequence, so long as it is *known*. In practice, however, it is found that the necessary calculations are, in most cases, very much simpler if they are of such strength that one atom or one equivalent of each substance is contained in the same measure of solution

Two systems of weights and measures are in use for preparing and using these solutions: the French or decimal system, which has the great advantage that its weights and measures bear a simple decimal relation to each other,—the unit of weight, the gramme, and the cubic centimetre, which in volumetric analysis may be considered as the unit of measure, being identical. In the other system the grain is taken as the unit both of weight and measure. I much prefer the decimal system, and always work by it; but as the other is perhaps in more general use here, and is the one adopted in the Pharmacopœia, I shall take it as the basis of the descriptions and examples that follow. In the decimal system, 1000 cubic centimetres of solution are generally made to contain an equivalent of each of the substances in grammes. In the grain system 1000 grain-measures contain an equivalent of substance expressed in grains. Thus, the standard SO_3 solution will contain 40 grains in 1000; the soda solution 31 grains in 1000, and so on. It will be seen that the solutions are of the same strength whether prepared on one system or the other, both having one equivalent in 1000, and therefore they may be used for either method indiscriminately. One great advantage of this uniformity in the strength of the solutions is that they are mutually and equally convertible. Thus, 10 grain-measures (a quantity which it has been proposed by Mr. Sutton, to whose work on volumetric analysis I am indebted for much contained in this paper, to call a decem and to accept as the unit of measure in this, as the C. C. is in the decimal system) of the standard or "normal" SO_3 will exactly equal or exactly neutralize 10 grain-measures of the standard soda solution, and *vice versâ*, and so through the whole list. Sometimes more dilute solutions than these are required; such are generally made one-tenth of the strength of the others, and are called decinormal solutions.

With regard to the apparatus, we require a means of delivering the solutions in such a way as not to waste any, and also of readily and accurately knowing how much we have used when the operation is finished. There are several forms of "burettes," which is the name given to the apparatus for this purpose. The best of them for general purposes is that devised by Mohr, of Coblenz, and consists of a tube open at both ends, capable of holding rather more than 1000 grains of solution, and graduated into 100 equal divisions of 10 grains each. To the lower opening, which is a small one, is attached a small tube by a piece of india-rubber tubing, which on pressure by a spring clamp of wire forms a very simple and effective stop-cock by which even drops can be accurately delivered. I have other forms here which will explain themselves. Besides the burette, a larger graduated vessel is required for preparing the standard solutions. This may either be a cylinder like the burette, only larger and graduated from 100 to 10,000 grains, or it may be a flask which holds 10,000 grains when filled to a mark in the neck. The former is better and more convenient, the latter cheaper. Two or three pipettes, or small dropping-tubes, which when filled to a mark in the narrower upper portion of the tube will deliver 100, 200, or 500 grains, are also very useful. A few flasks and beaker glasses, scales and weights, and a few chemicals to act as indicators, with the standard solutions, complete the volumetric outfit.

Analyses that may be made volumetrically can be roughly classed under three heads, viz. analysis by saturation, analysis by oxidation or reduction, and analysis by precipitation. I will shortly describe these divisions, giving an example or two as we go on. The first of them, or analysis by saturation, includes, and in fact is almost constituted by, the important items of alkalimetry and acidimetry. It is a property of all alkalies that they combine with acids ; neutralizing them, or destroying their acid properties, and becoming themselves neutralized, or having their alkaline properties destroyed thereby. It is also a property of the vegetable blue colour litmus that its blue is turned to a red by a very slight excess of acid, and again, that this reddened litmus is re-changed to blue by as slight an excess of alkali. If we have then a solution of any alkali with which a small quantity of Tinct. Litmus has been mixed and add to it an acid, this acid will be destroyed and thus rendered incapable of reddening the litmus as long as there is any alkali present. Immediately however the alkali is all decomposed, the next drop of acid will redden the previously blue liquid, and thus show the end of the operation ; then from the number of grain-measures of acid that have been used, the amount of alkali present is calculated ; whether this be soda, potash, or any other.

The principle of acidimetry is just the same as above described, only reversed : the litmus is added to the acid, is reddened by it, then standard alkali added till the blue is restored, and the result obtained by a similar calculation. As it is often required, in Alkalimetry especially, to know the percentage of pure material present in a given sample, it is well to weigh out such a quantity as if pure would be saturated by 100 of the alkalimeter divisions or decems (10 grain-measures). The number of decems of acid required then gives at once the percentage without further calculation. These cases where the result is obtained by direct saturation are among the simplest in volumetric analysis. There are many modifications of the saturating principle devised to meet particular cases, into which I cannot enter in a hasty sketch like the present, and I would here mention that in the examples I have given or may give, I describe only the broad facts and as simply as I can, without at all entering into the minutiæ of conditions necessary in particular cases. I have written this principally with a view of inducing those who may know but little of the subject to pursue it further.

Before we leave acidimetry we may just notice a process which does not come under the head of saturation analysis, but which is useful in some cases, especially in testing the strength of the commercial vinegars, whose brown colour somewhat interferes with the observation of the change of colour in the added litmus. This is the use of ammonio-sulphate of copper as an acidimetric solution. Ammonio-sulphate of copper solution may be regarded as a solution of CuO in NH_3, besides $NH_4O\,SO_3$. It is, as you know, a clear blue solution. If this be added to an acid, the ammonia combines with it and the CuO is precipitated ; this precipitated CuO is however re-dissolved by the acid as long as such is present, but when the acid is all neutralized the CuO is no longer re-dissolved, and the previously clear solution becomes turbid. The end of the operation is thus distinctly indicated.

The class of analysis by oxidation or reduction is of great importance, and its principle is very simple, although the processes are rather more complicated than in alkali or acidimetric estimations. Substances capable of combining with oxygen in known proportions, thus producing compounds with properties different from their original ones, are brought into contact with substances capable of yielding a known quantity of this element; and the end of the reaction is generally known by the production of some distinct colour. Thus, protosalts of iron combine readily with just half as much more O as they already contain, and are thereby converted into persalts of that metal. Now we have tests that will distinguish the smallest quantities of either of these salts, and we can therefore tell at once when the protosalt is all converted into persalt. Again, permanganate of potash, a salt whose solution in water is of an intense violet-red colour, yields up a certain quantity of O to substances capable of combining with it, and becomes thereby decolorized. If now a solution of $KO\,Mn_2O_7$ be added to a solution, say of $FeO\,SO_3$, so long as any of this remains the colour is discharged, but immediately it is all oxidized this beautiful colour shows itself and so marks the end of the operation. The permanganate is thus at once reagent and indicator.

Protosalts of iron and oxalic acid are the chief substances thus readily decomposed by permanganate, and as we can readily convert any iron solution we may have into the state of a protosalt, the amount of oxygen or permanganate required to convert this into a persalt is an accurate index to the amount of iron contained in our solution. The uses of oxalic acid in connection with permanganate are mostly of what is called an indirect character; thus lime and lead may be estimated by their means; not that permanganate has any action on either of them, but they are both perfectly precipitated by oxalic acid. If, then, to a solution of lime or lead, we add oxalate of ammonia in excess, taking care to know exactly how much we have added, the amount of this excess, more than would combine with the lime, and which we can estimate by the permanganate, subtracted from the whole amount used, gives us the amount which *has* combined with the lime; from this the quantity of lime is readily calculated. This may seem a complicated way of arriving at the result, but it possesses an element of great convenience, which is, that we need not wait to separate the precipitates entirely, but if we make our mixture of oxalates, etc. to a certain volume, the upper part will very soon have settled enough for us to take out one-fourth or one-fifth part clear, and multiplying the results obtained from this by four or five, as the case may be, we very readily get what we want to know. Bichromate of potash again is used as an oxidizing agent, in iron estimations more particularly. It will not, however, act as its own indicator as permanganate will, but the solution must be tested from time to time until the appropriate reagents show that there is no protosalt left. Iodine is also in many cases a powerful oxidizer, and the beautiful reaction between iodine and starch enabling us to detect the smallest traces of free iodine, many valuable processes are based on its use, both directly and indirectly. It is used directly in the estimation of sulphuretted hydrogen or sulphides in mineral waters or other substances, as these compounds, as also hyposulphites, are decomposed by it. If a solution of starch be mixed with any of these and standard I solution added, no colour will be produced till they are exactly decomposed, but when this is the case the intense blue is instantly developed. On account of this reaction between hyposulphites and iodine, a standard solution of hyposulphite of soda is used for the estimation of free iodine and is very useful in indirect analysis by means of it. Indirect analyses are so called when we do not directly estimate the amount of the substance we require, but the amount of something else that that substance may under certain circumstances be made to produce. For instance, suppose it to be required to know the value, that is, the oxygen-yielding power, of a sample of MnO_2. We do not estimate this O directly, —we have no convenient means of doing so,—but if it be boiled with HCl a certain equivalent of Cl is produced to the amount of O yielded by the sample. We have, however, again, no ready means of estimating this Cl, but if the Cl be passed through a solution of KI an equivalent of I is set free for each equivalent of Cl used, and this iodine we can estimate with great nicety, as above noticed; but the indirectness of the analysis hardly ends here, for it is most convenient to destroy the I thus produced by a known excess of standard hyposulphite solution and then estimate the excess of hyposulphite again by standard iodine and starch. This may seem a roundabout and complicated method, but is not so in practice, and there is no class of volumetric analysis that yields such accurate results as these indirect ones with iodine. Besides MnO_2 there are many substances that will when boiled with HCl liberate chlorine, and which can therefore be estimated in this way.

We come now to the last division, that of analysis by precipitation, the principle of which is, that the substance to be analysed shall form an insoluble precipitate with the reagent employed. The end of the operation may be determined in three ways: firstly, by adding the reagent till no further precipitation occurs; secondly, by using some other substance which shall show when excess of reagent has been added, and thirdly, by adding reagent until a precipitate is commenced to be produced or the liquid becomes turbid. The mutual estimations of Cl by means of Ag, and of Ag by means of Cl, are the only ones that can be accurately made in the first way, as in few or none of the other cases where insoluble precipitates result on the addition of any reagent, do these precipitates settle down so readily and completely as to leave the liquid clear enough to see the exact point when precipitation ceases on addition of more reagent. The estimation of Ag by Cl was one of the earliest, as it is now one of the most important, of the applications of volumetric analysis. It is a point of great value to be able readily to ascertain the amount of real silver contained in the various alloys, solutions, and ores of this important and costly metal, and the old process by cupellation, as it is called, occupies considerable time. The volumetric assay of silver solutions is effected by means of a standard solution of NaCl, which is added to the silver with constant and strong agitation to cause the precipitated AgCl to clot together and leave the solution clear, so that the point may be seen when a drop of the salt solution ceases to produce any further turbidity. It is well in this analysis to work with dilute solutions containing only one-tenth of the ordinary standard quantity, *i.e.* an equivalent in grains in 1000 grain-measures. The analysis of chlorides by means of standard silver solutions is of course the same in principle as the above, only reversed, the silver being added to the chloride. It has, however, a considerable advantage over its companion process in that we can make use of another substance to show the end of the reaction, thus bringing it under the second division of analysis by precipitation. This is $KOCrO_3$ which forms with silver a blood-red chromate of silver, which, however, is not produced as long as any chloride is present in the solution, chlorine having a greater affinity for Ag than CrO_3 has. If a little chromate of potash be added to a chloride, and then the silver, the precipitate remains white until the chloride is all decomposed, when the appearance of the red colour at once indicates the end of the operation. So great a convenience is this, that in estimating silver, it is often well to add at once a known excess of salt and then estimate the amount of this excess by standard silver and chromate of potash. This facility for backward or residual, as well as for indirect analysis, is one of the great recommendations of the volumetric method. Thus if in any analysis the mark be overstepped by accident or carelessness, and too much of the reagent added, the operation is not spoiled, as the amount of this excess can generally be as readily ascertained as that of the original solution. The estimation of sulphuric acid, when in combination as sulphates, by precipitation by chloride of barium is another instance of the use of an indicator contained in the solution. If the precipitation alone were relied on, the difficulty caused by the non-subsidence of the precipitate would be fatal; but if a known excess of BaCl be at once added to the hot solution, this excess may be tolerably readily ascertained by means of standard chromate of potash solution. This precipitates the baryta as a yellow powder, but the delicacy of the indication is owing to the great colouring power this chromate of potash has for water, a very small quantity indeed communicating a decided yellow colour to the solution. As soon, therefore, as the BaO is all precipitated the liquid becomes yellow, and a very slight subsidence of the precipitate is sufficient for this to be observed.

The estimation of phosphoric acid or phosphates by nitrate of uranium is another instance of the use of an external indicator of the end of the reaction, but in this case it is not contained in the solution itself, but is brought in contact with it from time to time.

All soluble phosphates are precipitated by nitrate of uranium in the presence of NH_3 (under certain conditions which I need not here specify). The precipitate produced is one that settles very slowly, so that the end could not be known by the reagent producing no further precipitation. When, however, nitrate of uranium and ferrocyanide of potassium are brought together, an intense brown colour results. The uranium is therefore added to the phosphate till a small drop of the solution mixed with a drop of ferrocyanide on a white plate shows the commencement of this brown colour, and the uranium thus is shown to be in excess.

The third kind of analysis by precipitation, namely, that in which the end of the reaction is shown by the commencement of formation of a precipitate in a previously clear liquid, includes only two substances (if we except the use of ammonio-sulphate of copper as an acidimetric solution), that of cyanides by means of silver, and of chlorides by nitrate of mercury in the presence of urea. I will shortly describe the former, as it is of especial interest to the pharmaceutist as giving the means of estimating the strength of HCy and the amount of that acid in bitter-almond and cherry-laurel water, and also the value of the commercial cyanides of potassium. This beautiful and exact volumetric method was devised by Liebig, and depends on the fact that AgCy forms a double salt with KCy which is soluble in water; the slightest excess of silver, however, decomposes this and insoluble AgCy is precipitated. If, therefore, standard silver solution be added to an alkaline cyanide, no precipitation takes place till sufficient has been used to combine with half of the Cy present, the other half remaining in combination with the potash and forming the soluble double salt. As soon as this point is reached, the next drop of silver causes a precipitation of AgCy. One equivalent of silver used thus indicates two equivalents of Cy present. We may express this perhaps rather differently, and say that solutions of silver give with alkaline cyanides a white precipitate of AgCy, which is soluble in the cyanide either of potassium or sodium, as the case may be. When, therefore, the cyanide present is decomposed by the silver, it can no longer dissolve the AgCy, and a precipitate results. The law of equivalents teaches us that the exact point occurs when half the cyanide is decomposed and thus the whole amount present is readily ascertained.

I am well aware that the slight sketch of the leading features of volumetric analysis I have thus brought before you is a very imperfect one, and that it contains nothing new or original. I am also assured that many here are as well acquainted with the subject as I am. These will, I hope, bear with what will have been a dull evening to them, while they consider what I take to be an important part of the work of such associations as this,—the diffusion of useful knowledge among our younger members and associates, no less important than the mutual interchange of information on original subjects. I will therefore hope that even the cursory description now offered may have the effect of leading some to study further, and above all, to practise this beautiful and useful branch of analysis.

Mr. G. Ward, F.C.S. remarked that the paper to which they had listened with so much pleasure, could not fail to be practically useful to every one present. The introduction of materials for volumetric analysis into the British Pharmacopœia made the present communication especially opportune and acceptable. With reference to the six processes selected for admission into the British Pharmacopœia, he thought that with one exception, they all were deserving of confidence, as being processes in which the termination of the operation was sharply defined, and this was the first essential of a good method of volumetric assay. He thought that the bichromate of potash test for iron was often unsatisfactory in the hands of beginners, from doubts as to when the operation was over. The permanganate appeared to be preferable. He moved that the hearty thanks of the Association be given to the author of the paper.

Mr. Atkinson seconded the motion, which was carried by acclamation.

Mr. Reynolds exhibited some specimens which had been kindly lent by the Magnesium Metal Company (Limited), of Manchester. They included fine masses of the metal both in its crude and distilled state. Three forms of lamp that have been used for burning the wire or ribbon were also shown. Although the reflectors attached to these condense the light, the rapid combustion of the metal leaves much to be accomplished towards ensuring its steady consumption. The pure whiteness as well as intensity of the light was well shown by illuminating with it sheets of paper toned yellow, blue, or green, which colours could be distinguished as well as by daylight.

BATH CHEMISTS' ASSOCIATION.

There has been a branch of the Pharmaceutical Society in Bath since the formation of that Society, and in its early days it was one of the most flourishing offsets of the parent stem; but for many years it has been in a languishing state, and no meetings had been held amongst the chemists of Bath until the then approaching meeting of the Pharmaceutical Conference in our city called the chemists together, and there was formed, as a temporary association, the Bath Branch of the British Pharmaceutical Conference, composed of nearly every chemist of Bath, pharmaceutical or not. After the meeting of the Conference, this temporary association, having fulfilled its purpose, was dissolved, and under a sense of the advantage and pleasure derived from meeting together, the chemists of Bath formed themselves into a society.

At the second meeting of the Society the following address was delivered by the President, Mr. TYLER:—

Gentlemen,—As you have done me the honour of placing me in this position as President of the Bath Association of Chemists and Druggists (though I much doubt the prudence of your choice), I can only assure you that nothing shall be wanting on my part, so far as in me lies, to perform the duties incumbent upon me so as to render our evenings at once pleasant and instructive. It gives me great pleasure (and perhaps I feel it more than many) that I shall have associated with me a gentleman, whose untiring energy and zeal is so well known and duly appreciated by all those who have worked with him. I need not say how fortunate we are in having the services of Mr. J. C. Pooley as our Secretary. It is owing to his indefatigable exertions that we thus meet together this evening, and the formation of this Association of Bath Chemists and Druggists for social enjoyment and friendly intercourse is solely to be attributed to him; and if the spirit in which he has laboured can be perpetuated, there can be no doubt but that good feeling and reciprocity of sentiment will pervade our little circle.

It is pleasing to see how city and town throughout the country are now holding meetings of a similar character, with a view to promote more social intercourse and advancements; and I do sincerely trust that Bath, in proportion to its population, will not be second to any, but that our members will each do something towards promoting the best interests of our Society. We start with one advantage which few similar societies possess,—I mean the use of an excellent library, belonging to the Bath members of the Pharmaceutical Society, but kindly and freely placed open for the use of the members of this Association. It contains valuable standard works on materia medica, chemistry, botany, etc.; and I trust the time is not far distant when we shall enjoy the privilege of having a room of our own, on the table of which we may lay our periodicals and papers, and in which we may meet to enjoy the advantages of social intercourse and discuss such topics as may be desirable, and consider any suggestions that may be of practical importance.

France has repeatedly been held up to us as a pattern and model of pharmaceutical intelligence, and superiority in laws and pharmaceutical governments; certainly many of their pharmaciens are far before us in intellectual pursuits, but are there not very many pharmaceutical chemists taking a much higher standing amongst us? In the 'Pharmaceutical Journal' for December last, there is a very interesting letter from Mr. Charles Ekin, "On the State of Pharmacy in France," which is well worth perusal; it states the high attainments expected from all members entering the profession (as it is *there* called), and many advantages to be obtained by passing a first-class examination. There is one curious privilege, that when a patient dies, among the first claims to be settled are those of the physician and chemist,—a law worthy to be introduced into our Codex. Following this letter is another from Mr. J. S. Weston on the same subject, viz. "The State of Pharmacy in France," but giving a most *unsatisfactory* account of the law on pharmacy; a commission having been appointed to inquire into the operation of the existing law, has presented a report, which shows the extreme weakness and imperfection of the present regulations. According to this report, the law prohibits secret remedies, and they *swarm*. It forbids the advertisement of secret remedies or new preparations, and the newspapers are filled with them. Pharmaciens ought not to supply medicines but with a physician's prescription, yet, for the most part, as much medicine is sold without as with them; they ought to confine themselves to the Codex, yet many use other formulas; and it thus happens that a medical man does not always obtain for his patients the medicines he desires. "Finally, as the law neither defines a secret medicine, nor a required medicinal weight, it results that mineral-water manufacturers, druggists, colour merchants, photographers, perfumers, grocers, herbalists, with a crowd of pretended chemists and charlatans, exercise medicine and pharmacy more or less illegally, to the great dishonour of these honourable professions." The report closes with this observation:—"A new legislation, giving greater protection to pharmacy and medicine, is thus become necessary." It really appears, gentlemen, as if France were taking a leaf out of our book in thus demanding a new legislation in pharmacy.

And this brings me to the subject of our new Pharmacy Bill. It is very pleasing to find with what energy and zeal the project of this Bill is being taken up; a new spirit seems to pervade all, whether pharmaceutical chemists or otherwise, the former indeed being in the minority. Many of the returns made are highly satisfactory: in Weymouth, every chemist but one has signed the appeal; at Canterbury, every chemist; at Leicester, all but one (43 having signed it); at Brighton, 45 out of 52, and besides this 31 assistants; in Manchester, 116, of which 37 only were pharmaceutical chemists; and here in Bath, nearly every chemist and 15 assistants have signed it; and I have no doubt that when the returns are fully made, the majority in favour of the Bill will be very great. All speak in the highest terms of the Bill, and also of the liberal offer made by the Society to all who really feel inclined to become members by examination. Nor can I see the practical difficulty which some apprehend; the examinations have a practical rather than a theoretical bearing, and I feel quite sure there is no person in this room who is not perfectly qualified for passing such an examination; it would be an insult to their understanding and attainments to doubt it for an instant. Only let one try, and the result would be that others would follow, and we should soon be a truly Pharmaceutical Society, members rejoicing in M. P. S. won by examination,—a far more honourable distinction, allow me to say, than any title procured by purchase. I am conscious of a certain delicacy in addressing some whose opinions upon the Pharmacy Bill may differ very widely from those to which I have given expression, but that feeling is to a great extent removed when I consider that it is one of the objects of this Society to give frank expression to opinion upon matters of common interest and while I shall, I hope, ever listen with deference to the utterance of sentiments adverse to my own, when claiming the same sincerity as those which I now offer, I shall hail with pleasure the honest acknowledgment of any who with Mr. Moffat, of Glasgow, say, "I was mistaken." I must, however, in common honesty to those gentlemen who form the Council of the Pharmaceutical Society, declare that I firmly believe that their intentions are purely devoted to the true interests of the body generally; their very names are a guarantee for the honesty of their proceedings.

I do sincerely trust we shall not be looking with a jaundiced eye on one another because we think differently, but let the love of the noble science with which (worthily or unworthily) we stand connected preserve good feeling and fellowship, and may materia medica, pharmacy, chemistry, botany, etc., secure more of our attention, make us more earnest and zealous, and thereby "more honoured because more honourable." There is another point to which I would now more especially call your attention,—it is micro-chemistry. I am sure that those who saw the beautiful specimens exhibited at the Conference by Messrs. Deane and Brady, since then engraved in the 'Proceedings of the Conference,' and also the objects shown by Messrs. Stoddart, must have been delighted. I need not dwell upon the obvious advantage of the knowledge of "how to work with the microscope" in detecting adulterations, etc.

I do not know if any gentleman has worked the British Pharmacopœia, but I must say the more I know of it the more I am pleased; it certainly far surpasses the expectations my first impression of it led me to entertain; we must not expect perfection, and but for some unwise alterations, which certainly are not improvements, it is a "move in the right direction." There has been a considerahle compromise made to satisfy Scotland and Ireland, but on the whole it is a valuable book, and with Squire's 'Companion' it is rendered much more complete; in time it must of necessity become our law.

With regard to the Poison question, that has been so well ventilated at the Congress that it would be only waste of time to enter on it, except to compliment those gentlemen whose zeal and industry were rewarded by so excellent a report. In conclusion, I do most sincerely trust we shall none of us forget the proposal upon which we so generally agreed, to close our shop upon the Sunday; even in a worldly point of view, I am quite sure we shall find a substantial proof of the promise that "those who honour Me, I will honour." It is now more than twenty years since I adopted that plan, and I am sure I have lost nothing, but gained much; but even had I lost much, I believe I should have gained more.

After which it was proposed by Mr. P. Harding, seconded by Mr. King, and resolved, that the address be copied into the minute book of the society, and also that a copy of the address be forwarded to the Editor of the 'Pharmaceutical Journal,' together with a brief sketch of the origin of the association, and a request that it be inserted in the next number of the Journal.

CHEMICAL DISCUSSION ASSOCIATION OF THE PHARMACEUTICAL SOCIETY.

Report of the Committee to the Anniversary Meeting, January 9, 1865; Dr. T. Redwood, President, in the chair.

The Chemical Discussion Association has now reached the Seventh Anniversary of its formation, and the committee present their Report with no less satisfaction than in former years. If during the past session the number of meetings has been somewhat fewer than usual, the valuable and interesting character of the communications made to those meetings fully makes up for any deficiency in other directions, and must be a subject for congratulation to the members.

While looking back with pleasure over the results obtained since the last anniversary meeting, and tendering their thanks to those gentlemen who have assisted them by bringing forward their papers, the Committee look to the members generally, but particularly to the younger members, to whom the existence of the Association must be especially useful, for their assistance and co-operation in furnishing matter suitable for discussion throughout the year that has just commenced; and they repeat what has already been urged, that communications intended for the Association need not be in a state of elaboration. Unfinished researches frequently derive a stimulus from the information elicited in course of the discussion which constitutes a feature of these meetings.

The account of the treasurer will be found to be very satisfactory as regards the financial position of the Association.

During the session seven new members have been added to the list.

Appended are the titles of communications that have been received during the year:—

"Note on the Chemistry of Insects." Mr. C. Sharp.

"On Sweet Spirit of Nitre." Mr. Fewtrell, F.C.S.

"On the Preservation of Vegetable Powders." Mr. C. H. Wood, F.C.S.

"On Granulated Sulphate of Iron." Mr. H. Smith.

"On some Reactions of the Sulphuric Acid Chamber Crystals." Mr. Broughton, B.Sc.

"A Contribution to the History of Balsam of Peru." Dr. Attfield, F.C.S.

"On Perchloride of Iron in Solution." Dr. Attfield, F.C.S.

"Note on several New Organic Compounds." Mr. W. A. Tilden.

"On Mr. Stoddart's Method of Examining the Cinchona Alkaloids." Mr. J. Watts.

"On the Purification of Essential Oil of Almonds." Mr. W. A. Tilden.

Officers for 1865:—President, T. Redwood, Ph.D; Treasurer, S. Gale; Secretary, A. Tilden. Other members of the Committee: Messrs. J. Attfield, Ph.D., J. Broughton, B.Sc., A. F. Haselden, J. Ince, J. Watts, and C. H. Wood, F.C.S.

MEETINGS ON PHARMACY BILL.

EDINBURGH MEETING.

A meeting of Chemists and Druggists, called by public advertisement, to consider the new Pharmacy Bill, was held in St. George's Hall, 119a, George Street, Edinburgh, on the evening of Tuesday, 20th December, at half-past nine o'clock. There was a good attendance, fully forty being present, about one-fourth of whom only were connected with the Pharmaceutical Society. Among those present were, Messrs. Young, of Macfarlan and Co., Tait and Buchanan, both of Duncan, Flockhart, and Co., Aitken, Nicoll, Noble, Blanchard, Mackay, Storrar of Kirkaldy, Mackenzie, Taylor of Musselburgh, Aitken, jun., etc. etc.

Notes of apology from several unavoidably absent were read.

Mr. George Blanchard was called upon to preside. After a few remarks, he requested Mr. Mackay to explain the object of the meeting.

Mr. Mackay then stated the purpose for which the meeting had been called, and proposed to read the whole Bill as at present in the hands of Sir George Grey, or to give an abstract. Those present having unanimously desired that the whole proposed Act should be read, Mr. Mackay did so, commenting upon and explaining the various clauses. A good deal of question and answer followed, in which several took part, and at length, after a full explanation, there appeared to be no objection to any portion of the Bill, excepting the clause fixing the age of the assistants at twenty-one years. A chemist present thought nineteen would be a more suitable age, and hoped the passers of the Bill would make this alteration before it passed the House of Commons.

Mr. Mackay then moved the following motion:—"That this meeting approve of the Amended Pharmacy Act now before Parliament which has already been fully published in the 'Pharmaceutical Journal,' do hereby express an opinion favourable to the provisions of said Bill, and agree to do all in their power towards supporting and carrying this measure through Parliament during the approaching session, believing that such an Act is desirable alike for the interests of the public at large, as well as for regulating and recognizing chemists and druggists throughout the country."

Mr. Nicoll, Dundas Street, seconded this motion, and the Chairman having asked if there was any amendment, declared the motion unanimously carried, which it was, with acclamation; and after a vote of thanks to the President, the meeting adjourned.

MEETING OF THE LIVERPOOL CHEMISTS AND DRUGGISTS.

On Thursday, the 5th instant, an influential meeting of the chemists and druggists of Liverpool, Birkenhead, and the neighbourhood, was held in the lecture hall of the Royal Institution, Colquitt Street, Liverpool, for the purpose of discussing the provisions of the proposed new Pharmacy Act.

Mr. Sumner, who was called to the chair, opened the proceedings by saying, the object of the meeting was to give the chemists and druggists of Liverpool an opportunity of expressing their opinion of the provisions of the extended Pharmacy Act, which would shortly be laid before Parliament. Perhaps without further preface on his (the Chairman's) part, Dr. Edwards would indicate what the Pharmacy Act was to do for the present and the rising generations.

Dr. Edwards regretted the absence of his colleague on the Council, Mr. H. S. Evans, who was detained by domestic bereavement from being present that evening, but whose heart was with them in the objects of the meeting. The chemists and druggists, as dispensers of medicine, had long had under consideration the desirability of associating themselves into one distinct and broad phalanx, and consolidating the body, not only for the resistance of attacks on the part of any adversaries, but also for the promotion of their status in the way of education, and thus rising from the ranks of a mere trade to that of a profession. The present movement was one which had not originated within their day. Movements had come to them from time to time from without, and it was in the first place an aggression from a medical body which caused them to associate together for the resistance of an encroachment upon their trade rights, in the form of a Bill laid before Parliament by Mr. Hawes. They were then induced to form the nucleus of what afterwards took the position of the Pharmaceutical Society of Great Britain.

The United Society had sprung up from a similar alarm, which however had proved groundless, and they took credit to themselves for vanquishing an enemy which had no real existence. It was to be regretted that such an attempt had been made to destroy the *morale* of the Pharmaceutical Society as a representative institution. Double societies, and double examinations, and double bills, were not likely to forward the general progress of the body. It had been abundantly shown in the past history of medical bodies that divided authority and competitive standards of examination were not conducive to the onward progress of a profession, and that it was desirable that union and consolidation should take place, in order that all should advance together. They could not carry forward a body of men unless they had the *whole* of the body in one universal progress. The progress of an army depended not merely upon the advance of the vanguard, but in a great measure also upon the progress of its commissariat. The march of the Pharmaceutical Society had somewhat exceeded the rate of progress of the chemists and druggists, and at the present they were at a pause, because it was said by the Medical Council, who had just consolidated themselves into one compact body, that it was very desirable that the subject of Pharmacy should be considered, and that, while a very great amount of good had resulted to the public from the union of the different medical bodies together into one body, represented by the Medical Council, yet nevertheless there was one flaw in the general arrangement, and that related to the dispensers of medicines, who ought to be provided for under a similar arrangement. Therefore, the Medical Council in committee considered this subject, and, after a very considerable amount of deliberation, they found that it was not desirable to attach Pharmacy as a branch of the medical profession, under control of the Medical Council. That was for a long time a matter in discussion with them; but the chemists themselves had said over and over again that they were an independent body, and they were not a branch of the medical profession. They preferred to be at the head of the profession of pharmacy to be at the tail of the profession of medicine. That was their constant point, and in that particular the Medical Council had given their approval, and had said, in common with the chemists and druggists, that it was better for the public benefit, and for the exercise of the medical profession, that pharmacy should take an independent position, rather than that it should be such a branch of the medical profession. If they required an example, they had it in the history of the apothecaries, who had certain exclusive class privileges as a lower branch of the medical profession. They were not satisfied with being in that position, and climbed step by step until they got into the position of general medical practitioners. It was therefore recommended by a number of the speakers at the Medical Council that the matter should be referred either to the Pharmaceutical Society, or to some other body appointed by Government.

There was another branch of the subject which touched upon legislative action in the same way, and that was with reference to the unrestricted sale of poisons. Upon that subject a committee of the House of Lords had sat and taken evidence, and a Bill was brought before Parliament with the intention of restricting the sale of poisons to a superiorly educated class of vendors. In consequence of the lapse of office of that government that bill was thrown aside, and at present no legislation had taken place with reference to the sale of poisons; but still it was a matter which had been thrown upon the attention of the Government as one deserving of attentive and careful consideration. With respect to that subject, a Government inquiry had been instituted by the Home Office of the present Government, and Dr. Taylor had reported in favour of an educational standard of qualification on the part of all engaged in the sale of poisons, and made a recommendation that the subject should be referred to the Pharmaceutical Society. Therefore, from two different points of view, it had been impressed upon not only the present Government, but upon former Governments also, that, so far as the medical profession was concerned, they desired a higher qualification; and, on the other hand, that it was desirable on the part of Government that the sale of poisons should be restricted to those who were well qualified to judge of the nature of the medicines which they sold. What was wanted was education as a basis of qualification; a payment in recognition of the expenses which were to be incurred in order to obtain legitimate status; and then it was required that that should be indorsed by a legal recognition, and to have, in return for that, some kind of diploma or certificate, which should be in the possession of every chemist and druggist, indorsed in some way by Government, to show that it was a legal recognition. The Council of the Pharmaceutical Society had been most anxious to strengthen their borders as far as possible, to admit volunteers into their society. The Pharmaceutical Society was, in the first place, a body of volunteers, and he believed that its very strength, its very power, and its moral influence, consisted in the fact that it was composed of a body of men who were educationally equal to their position, and who had voluntarily united themselves into a body for the protection of those interests which were dearest to the trade in general; and that volunteer band had always been willing to put their hands into their pockets for the defence of the common interests of the body, whether belonging to the Society or not.

In reply to the Chairman, Dr. Edwards said it was intended to give the title of "registered chemists and druggists" to the persons registered.

Mr. Shaw moved the following resolution:—"We, the undersigned chemists druggists, residing and carrying on business in Liverpool and the district, having read the principles of the bill for regulating chemists and druggists published in the 'Pharmaceutical Journal,' pledge themselves to use their best endeavours to obtain the passing thereof into law." The bill, he said, had his entire approval, and he did not see any fair objection that could be raised to it.

Mr. J. A. Turner had great pleasure in seconding the resolution, which he thought commended itself to the common sense of all, and that, he apprehended, was the most useful sense. The Pharmaceutical Society had, he considered, been the pioneers of that general progress which was now becoming acknowledged and apparent, and he should feel every confidence in a general measure which originated with that body.

The resolution was put to the meeting, and unanimously agreed to.

Mr. Robinson moved the next resolution, which was as follows:—That this meeting recommend chemists and druggists generally to sign the memorial in favour of the bill which is now prepared for presentation to the Secretary of State for the Home Department. He confidently submitted the motion to the meeting, cordially endorsing its purport, but at the same time anxious to hear adverse criticism, if any gentleman present had such to offer.

Mr. Wright had great pleasure in seconding the motion. There was one remark, however, which he should like to make. In the old Pharmacy Act he believed apprentices and assistants were placed on the same footing as associates. Now there was no mention made of apprentices in the present Bill.

Dr. Edwards explained that apprentices might be registered as such, but it would be to their interest to pass the Minor Examination to prove their efficiency; and, after some further conversation on the subject, in which Mr. Wright agreed, and stated that he had taken the objection on behalf of others than on his own account, the motion was unanimously adopted.

Dr. Edwards explained, in reply to a question, that the registration of sales of poisons was suggested by the Secretary of State, and therefore the Council had prepared a draft clause, requiring such registration of each sale from all dealers not registered as chemists and druggists under this Act. This bill would, they hoped, meet the requirements of the Medical Council as such, and be conciliatory to the Government on the subject of the sale of poisons; and they thought that if a bill was submitted by the Pharmaceutical Society which meets with general approval on the part of the whole body of chemists and druggists, it would then become a Government measure. It would then be a measure of medical police, to be carried on and not be done in the face of the House of Commons, but with their approval. It was for that object that the support of the chemists and druggists of Liverpool was wanted by signature to the requisition. They wished to lay a very strong representation on the subject before Sir George Grey. A very large number of signatures had been obtained throughout the country, and he should have been very glad to have called an earlier meeting for Liverpool, but circumstances over which he had no control whatever prevented him doing so. He had done so at the earliest possible moment, and it was considered desirable that as large a number of signatures as possible should be obtained, in the hope of making it a Government bill. The cost of the bill, if they were to attempt to carry it through as an independent measure, would be £600 or £700, whereas, if they could get it carried as a Government measure, the cost would be but trifling. In leading articles, and in the correspondence of chemists and druggists, it was continually thrown into the teeth of the Pharmaceutical Society that they wished to enrol the chemists and druggists and get subscriptions from them, and yet not to give them any voting powers in the management of the affairs of the Society. That was a total misrepresentation. In order to secure the bill it was very necessary to spend money, and the parties benefited by the bill should recoup the Society for that expenditure. There was, therefore, the moderate charge of one guinea for each registration, or whatever other sum might be hereafter agreed upon; and it certainly did not require that there should be any connection at all, or any representative power, or any further union between the body of chemists and druggists so registered and the Pharmaceutical Society.

It would be perfectly voluntary on the part of the chemists and druggists to apply for memberships, and in order to do that they must pass through the door of the Major Examination. It was also open to them to become Associates of the Society; but it was proposed to throw open the Benevolent Fund to the entire trade, whether belonging to the Society or not.

Mr. Smith, of Great Howard Street, said, it was not his intention, when he entered the meeting, to offer any observations on the Bill, but as criticism had been invited he would say a word or two in reference to it. A bill, it appeared, was about to be presented to the House of Commons for the purpose of protecting the trade generally. That he believed to be a good provision, and one very much needed; but as a member of the United Society of Chemists and Druggists he deprecated such an attempt to rule the majority; and the manner in which it was attempted would, in his opinion, prove entirely futile. The Pharmaceutical Society numbered, he believed, about 3000, and the number of chemists and druggists in Great Britain was 30,000.

Dr. Edwards said, the Registrar General's returns only gave about 6500 in the trade altogether.

Mr. Mercer said he believed that the number of chemists and druggists was from 6000 to 7000, and that a great number of the members of the United Society of Chemists and Druggists belonged also to the Pharmaceutical Society.

Mr. Smith continued remarking that he could not see why chemists and druggists should be registered as chemists and druggists, and not have the same privileges as the Pharmaceutical Society. Why not extend the hand of fellowship at once? Dr. Edwards had said, unity was strength, and so it was. He (Mr. Smith) was of that opinion too, and unless united action was taken by the Pharmaceutical Society and the United Society of Chemists and Druggists, their bill would never be passed. He would ask one question, Was it intended that all chemists and druggists who did not enter their names on the register should be debarred from practising as chemists and druggists? Was it intended that it should be retrospective?

Dr. Edwards: The registration will be compulsory.

Mr. Smith: Then in my opinion—and I think the same opinion will be held by a great many chemists and druggists—such registration is not consistent with British law and British equity.

Dr. Edwards said a similar provision was proposed by the United Society of Chemists and Druggists.

Mr. Smith said, yes, but he believed the United Society of Chemists and Druggists did not even intend to exclude apprentices from the rights and privileges of being chemists and druggists. In his opinion, no Act could come into operation within five years, and apprentices in business had a right, he thought, to similar privileges. He hoped the Pharmaceutical Society would extend their hands as freely and frankly as possible in order to do that which had been wanted for years to protect the public and protect the trade generally.

The Chairman wished to know in what way Mr. Smith wished the Pharmaceutical Society to extend the hand of fellowship?

Mr. Smith replied, to extend it to all chemists and druggists who were not members of the Pharmaceutical Society, and who were, to a great extent, as well educated and as well qualified as many who were now registered pharmaceutists. There were many pharmaceutists who were not so by examination, but through a privilege which was given some years ago to "outsiders," who were admitted on paying a fee of £5. Such privileges were taken advantage of; and therefore, so long as there had not been a compulsory examination in every instance, he thought it would be an act of injustice to "outsiders" now to compel men to pass on examination who had been in business perhaps for many years—men perhaps of the same amount of practical experience as those registered as pharmaceutists. He thought it was a narrow way of doing it; it was not sufficiently generous. If the "outsiders" wanted to come forward and join the Society, he saw no reason why they should be deprived of the designation of pharmaceutists.

Dr. Edwards: That is to go back twenty years, and make a fresh start.

Mr. Mercer, in moving a vote of thanks to the Chairman, said he was only sorry that gentleman's duties had not been more arduous. He (Mr. Mercer) should certainly like to have heard the different clauses of the Bill criticized more closely than they had been, for it would not be possible for any persons to draw up a Bill which would satisfy every one interested in it; and in this Bill there were very wide interests to be considered. There were the opinions of the Home Secretary, representing the Government; there were the interests of the medical profession, the interests of the founders and members of the Pharmaceutical Society, and the interests generally of the body of chemists and druggists. For his own part, he thought the framers had been very successful in keeping in view the interests of all those various bodies; and if there was one class of persons treated more liberally and generously by the framers of this Bill than another, it was the class of chemists and druggists outside the Pharmaceutical Society. Mr. Smith, the gentleman who spoke last, has raised an objection which had been raised over and over again, but which he (Mr. Mercer) did not think had any foundation at all, namely, that the chemists and druggists were going to be "governed," and therefore that they ought to have a voice in the selection of the body governing them. They were not going to be governed at all; the principle of the Bill was to retain for the chemists and druggists all the privileges and rights which they at present enjoyed, and in addition to give them a little protection, because no one could come into the trade after a certain date who had not passed an examination, and that, while it protected the public, must also act as a protection to those chemists and druggists who were already in business. They had a very good precedent, as had been referred to by Dr. Edwards, in the apothecaries, and no doubt that would be followed in the present instance. The apothecaries then in business had their rights and privileges maintained, and from that day down to the present the apothecaries had been gradually improving in their position (as he had not the least doubt the chemists and druggists would improve in *their* position) until now: as had been before remarked, they had raised themselves to the higher branches of the medical profession, and were now joined with them in the Medical Council. He hoped that, on a future occasion, if they had an opportunity—and he hoped they *would* have an opportunity—the gentlemen opposed to the Bill would really bring forward the most forcible objections they possibly could, press those objections, and put them in a tangible form, so that they might agree upon a Bill which would meet the views of all, and tend to elevate the position of the chemists and druggists to that at present occupied by the members of the Pharmaceutical Society.

Mr. Charles Jones, of Birkenhead, briefly seconded the motion, which was carried by acclamation.

The Chairman, in acknowledging the compliment, said, with regard to the Bill and the conflicting interests between the chemists and druggists and the Pharmaceutical Society, he thought, before any Bill, was passed, through the House of Commons, all interests would be so far argued and sifted and tested and tried, that there would be no interest that would be omitted. He did not think the chemists and druggists, as a body, would have anything to find fault with in a Bill that passed the House of Commons.

The meeting then separated.

MEETING OF THE CHEMISTS AND DRUGGISTS IN NOTTINGHAM.

A General Meeting of the chemists and druggists of this town was held at the Maypole Hotel, on Thursday evening, the 5th of January,—Mr. Charles Welsh in the chair,—to consider the proposed Amended Pharmacy Act for regulating the qualifications of chemists and druggists.

The Chairman called upon the Local Secretary, Mr. I. H. Atherton, to introduce the Bill.

The Secretary, before proceeding to explain the Bill, read the communication which he had received from the President. The Bill was afterwards read and freely discussed, when the following resolutions were unanimously adopted:—

1st. That in the opinion of this meeting, the proposed Amended Pharmacy Bill for regulating the qualifications of chemists in this country is admirably adapted to meet the requirements of the trade, and is essential to public safety. Proposed by Mr. Shepperley, seconded by Mr. Burton.

2nd. That this meeting fully appreciates the great efforts of the Council of the Pharmaceutical Society to obtain legislation on this matter, and pledges itself to aid by all possible means the exertions of the executive in the passing of the Bill through Parliament. Proposed by Mr. Fitzhugh, seconded by Mr. Squire.

3rd. That the Local Secretary be requested to forward a copy of these resolutions at the proper time to the members in Parliament for the town and county of Nottingham, and to request their support to the proposed Bill. Proposed by Mr. W. H. Parker, seconded by Mr. F. White.

After a discussion on the Juries Exemption Bill, the following suggestion was adopted, and Mr. Atherton was requested to forward the same:—"That this meeting further desires to suggest to the Council of the Society the desirability of extending the exemption from juries to all registered chemists and druggists, as well as to members of the Pharmaceutical Society."

After a vote of thanks to the Chairman, the meeting separated.

The following letter relating to the above was received from the Local Secretary:—

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In the present critical position of Pharmaceutical legislation, it is highly important that the opinion of the trade (Pharmaceutical and non-Pharmaceutical) on the proposed Amended Pharmacy Bill, should be fully understood and properly represented; so that the Executive in London may be able to prosecute their arduous undertaking with success.

Having this object in view, on receipt of the valuable letter from the President, directed to the local secretaries, I deemed it advisable to convene a general meeting of the trade in Nottingham, so that the proposed Bill might be properly discussed. I have great pleasure in saying that in every way we were successful, upwards of twenty of the leading chemists of the town attended, including many of the so-called members of the United Society, and their local secretary. Resolutions, expressing the unanimous approval of all present to the proposed Bill, were adopted by the meeting, which further pledged itself to support, in every possible way, the efforts of the Council to obtain the required legislation.

I have since obtained the signatures of all the chemists in the town (with one exception) to the requisition to the Council,—18 Pharmaceutical Chemists, 38 Chemists and Druggists, and 12 Assistants, in all 68 unanimous in favour of the Bill. This of course is satisfactory; but the gratification is greater from the fact that in every instance the signatures were given most willingly. During my canvass I was pleased to hear the Society so well spoken of, and not in one instance was any other project urged in opposition to their acknowledged liberal measure.

Before closing this short note, might I suggest to the local secretaries in different parts of the country, that the success of this and other schemes depends upon their individual exertions? I think it will be found that where the local officer is apathetic and lukewarm in its interests, there the Society languishes. But on the other hand, where he is willing (and surely there are such in every town) to look after its interests, there will the Pharmaceutical Society, with its noble aspirations, be appreciated and retain its supremacy.

I am, dear Sir, yours faithfully,

J. H. Atherton, *Local Secretary.*

Nottingham, January 6, 1865.

MEETING OF CHEMISTS AND DRUGGISTS AT SOUTHAMPTON.

At a meeting of the Chemists and Druggists, convened by circular sent to every one carrying on business under that designation in Southampton, Mr. W. B. Randall in the chair, the several clauses of the Pharmacy Bill were read and discussed, when it was unanimously resolved, upon the motion of Mr. Smith, seconded by Mr. Johns,—"That this meeting, having discussed the various clauses of the Pharmacy Bill, heartily approves of the same, and urges upon the Council to take such steps as shall secure its being passed into a law."

A vote of thanks to the Chairman concluded the meeting.

Edward Palk, *Local Secretary.*

January 21, 1865.

My dear Sir,—I hasten to send you the result of our meeting, held last evening, at which there was a *very full discussion* of the clauses of the Bill, and every clause received the unanimous approval of the meeting, except the first, and that was carried with only one dissentient. The *whole* body of chemists and druggists are much indebted to the Pharmaceutical Council for their indefatigable and untiring exertions to improve the character and raise the standard of those carrying on business under that designation, and I trust they will be rewarded by a successful issue to their exertions by securing the passing of this Bill through the Legislature. I will get the signatures to President and Council, and send off to-night.

I am, my dear Sir, yours truly,

Edward Palk, *Local Secretary.*

Mr. Bremridge, 17, Bloomsbury Square.

ORIGINAL AND EXTRACTED ARTICLES.

NOTES ON CONESSINE, *ALIAS* WRIGHTINE.

BY R. HAINES, M.B.,

PROFESSOR OF MATERIA MEDICA, GRANT COLLEGE, BOMBAY.

I observe in the last volume of the 'Pharmaceutical Journal,' at page 493, a paper by Dr. Stenhouse on a new alkaloid, *Wrightine*, discovered in the seeds of the *Wrightia antidysenterica*. The following extract will show that the observation is not so new as it has been supposed, though the small circulation of the publication from which the extract is taken, and the brevity of the notice itself, render this a matter of very little surprise:—

"Dr. Haines read a short paper on a new vegetable alkaloid, extracted from the bark of the *Wrightia antidysenterica*, the '*Khooda*' of the bazars. The alkaloid is resinous and uncrystallizable, of a powerfully bitter and somewhat acrid taste, insoluble in water, but very soluble in alcohol, ether, and chloroform. It exists in very minute proportion in the bark, only one part being procurable from one thousand parts of dry bark; it is supposed that the seeds contain it in much larger quantities. A specimen of the pure alkaloid was exhibited, and its alkaline nature shown by experiment. The writer proposed to give it the name of *Nereïne*, from the former name of the plant which yields it, *Nerium antidysentericum*. It is believed that this is the first alkaloid which has been extracted from the generally acrid and poisonous family the Apocyneæ, to which the plant belongs." (From the 'Transactions of the Medical and Physical Society of Bombay,' new series, vol. iv., Appendix of Proceedings, p. xxviii. Meeting of 2nd October, 1858.)

The name Nereïne being liable to cause confusion, now that an alkaloid or alkaloids have been found in the Oleanders, I had since proposed to myself, and now propose, to give to the alkaloid of *Wrightia* the name of *Conessine*, from the Hindustani name of the bark. I altogether rejected the name *Wrightine*, as too uncouth.

The paper itself was not published in the Transactions. I was in hopes to be able to make a full investigation of the new alkaloid, and to publish the results in a complete state, and my object at the time was merely to record the fact of the discovery, to exhibit a pure specimen of the alkaloid, and to demonstrate its nature in presence of the Society. Unfortunately, the demands made by public duty are here so numerous and exacting, that I have been unable thoroughly to fulfil my intention; but the publication of Dr. Stenhouse's paper obliges me, in justice to myself, to give as they are the results of my experiments, which were made at irregular intervals, and under circumstances far from favourable to accuracy, chiefly in the month of December, 1858.

The *Wrightia antidysenterica* is a small forest-tree, tolerably abundant over all Western India. It grows here and there on the hills on this and the neighbouring islands, but most abundantly in the Southern Konkan, and in the Sawunt Warree and Goa territories. The part of the tree on which I operated was the bark, which is of a reddish-brown colour, but lighter towards the wood, and loose and spongy in texture. It was coarsely powdered, thoroughly moistened with hydrochloric acid diluted with six parts of water, and after twenty-four hours, packed in a percolator and exhausted with cold water. The liquid was precipitated by an excess of ammonia, and the precipitate washed, dried, and exhausted with alcohol. After filtration, the alcohol was distilled off, the syrupy residue mixed with acetate of lead and a little ammonia, evaporated to dryness at a gentle heat, and exhausted with ether. The ethereal solution had a pale yellow colour, and on evaporation left the alkaloid as a tough, brownish-yellow, semitransparent, resinoid mass. Various attempts to crystallize it were made, but without the least success. Its taste and that of its salts was extremely bitter, conjoined with a distinct kind of acridity. After being thoroughly dried *in vacuo* over sulphuric acid, it was gradually heated in a test-tube placed in an oil-bath. At 71° C. it became soft, like wax; at 100° it was thoroughly melted; at 110° a few bubbles, either of water or spirit vapour, were given off; at 177° it acquired a dark brown colour; and at 205° it boiled up and became decomposed.

The solution in hydrochloric acid gave with bichloride of platinum a loose flocculent precipitate, rather fawn-coloured than yellow. After thorough washing and drying, this precipitate yielded in two trials 25·26 and 25·06 per cent. of metallic platinum: mean 25·16; giving as the equivalent of the alkaloid, taking the formula of the platinum salt as $x, HCl, PtCl_2$, 186·4. Some of the platinum precipitate having been left at rest in the mother-liquor for several days, a number of dark orange-coloured bodies were observed to be dispersed through the pulpy mass, and partly settled at the bottom of the vessel. On close inspection, these were found not to be crystals, but globular, semitransparent masses of the size of pins'-heads. They increased considerably in number, but not in size, by standing. As it appeared probable that these contained the platinum salt in a purer state than the bulk of the precipitate, they were separated by decantation, dried, powdered, dried again, and ignited.

I.—·7445 gm. left ·1835 platinum = 24·65 per cent.
II.—·5415 gm. left ·1330 platinum = 24·56 per cent.

Mean, 24·605

This gives ·196 as the equivalent of the alkaloid.

I.—·308 gm. pure alkaloid, burnt with oxide of copper only, gave carbonic acid ·8843, and water ·310.

II.—·506 gm. platinum salt, equal to ·2465 alkaloid, burnt with oxide of copper mixed with one-fifth chromate of lead, gave ·6985 carbonic acid, and ·264 water.

III.—·346 gm. platinum salt, equal to ·1686 alkaloid, burnt with soda-lime by Varentrapps's method, gave a platinum salt, which left after ignition ·092 platinum, equal to ·013 nitrogen.

The results are not sufficiently accordant to allow of the precise deduction of the formula:—

	I. Pure Alkaloid.	II. Platinum Salt.	III. Platinum Salt.
C	78·3	77·3	
H	11·2	11·9	
N			7·73
O			

The formula which agrees best with I. is $C_{26}H_{21}NO$; that most applicable to II. is $C_{25}H_{22}NO$:—

C_{26}	156	78·39	C_{25}	150	77·33
H_{21}	21	10·55	H_{22}	22	11·34
N	14	7·04	N	14	7·21
O	8	4·02	O	8	4·12
	199	100·00		194	100·00

The latter formula also gives an equivalent number more closely corresponding with that deduced from the ignition of the platinum salt, but nevertheless the uneven number of the carbon equivalents renders it a very improbable one.

To my great regret, I have had no opportunity of repeating the analysis with more care; hence the results are not so satisfactory as I could wish, and but for the reasons above given, I would willingly have withheld them.

COCHINEAL COLOURING.

For the following formula we are indebted to Dr. George Dickson, of Edinburgh:—

"Cochineal colouring may be prepared without admixture of carbonate of potash, alum, etc., as follows:—

Take of—

Cochineal in powder, 1 oz.
Spirit of wine, 2 oz.
Water, 6 oz.
Liq. Ammon. Fort., q. s. (about ♏viij).

"Mix the spirit and water, and in three ounces of the mixture, heated to near the boiling-point in a flask, infuse the cochineal for fifteen minutes. Pour the infusion into another vessel, and repeat the process with three ounces more of the mixed spirit and water; and a third time, with the remaining two ounces. Let the liquid stand till cold, when some fatty matter will rise to the surface; filter, adding spirit and water, up to eight fluid ounces. Lastly, add sufficient Liq. Ammon. Fort. (about ♏i to ʒi) to change the infusion to the desired tint.

"The objections to the use of carbonate of potash, alum, etc., are:—1st, the colouring-matter is thrown down as a lake, and after some time, forms a layer at the bottom of the containing vessel, requiring the addition of ammonia to redissolve and keep it in solution; and 2nd, it does not keep well. On the other hand, the advantages of this preparation are:—1st, the colouring-matter remains in solution, and 2nd, it keeps well, and has no unpleasant odour."

SEA-WEED WINE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I beg to call your attention to a remedy which was suggested to me by the 'Gazette Hebdomadaire de Paris' in the spring of last year,—namely, "Sea-weed wine," stated to be far preferable to all preparations of iodine, and perfectly safe in its administration in that large and oftentimes unmanageable class of cases understood by the term "scrofula." For years past, I have found that if I could get patients with hip disease, disease of the vertebræ (Pott's disease), scrofulous disease of the knee and other joints, to eat oysters, and especially in any quantity, that they rapidly recovered. I therefore anticipated the results spoken of in the paper alluded to, and asked Messrs. J. Bell and Co., of Oxford Street, to make some "sea-weed wine." This they kindly did; and I and my colleague Mr. Naylor, have now used it largely, both in private and public, in the Cripples' Nursery and the Royal Orthopædic Hospital, with a success that has surpassed our expectations, evidenced by a rapid improvement in health, arrest of disease in that most formidable affection disease of the hip, and other bones and joints, in children. I have, therefore, thought it my duty to forward to you these particulars. Should you think them worthy of publication, they are at your service.

I am, Sir, your obedient servant,

R. W. Tamplin.

January 23, 1865.

PURIFIED OIL OF BITTER ALMONDS.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Sir,—At the last meeting for discussion at the Pharmaceutical Society, it was stated in reference to the Essential Oil of Almonds freed from Prussic Acid, that the article lost its flavouring properties by the processes used.

As large manufacturers of the Pure Oil, and having been much interested in it for many years, we trust you will allow us a small space in your valuable Journal to assert that by our process the Oil is not at all deteriorated in quality.

We always use the essence made from our Oil at our private houses, and therefore can speak practically upon it, and we have now in our counting-house the specimen sent to the Exhibition of 1862, which, although exposed to light and air, is as free from Prussic Acid as when first made, and has neither crystallized nor lost its flavour.

We remain, Sir, yours obediently,

Preston and Sons.

88, *Leadenhall Street, London, Jan.* 20*th*, 1865.

POISON BOTTLES.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Perhaps the following plan for distinguishing bottles containing poisonous liquids, kept on the same shelf with others containing innocuous preparations, may find favour with those who, like myself, are unwilling to discard old friends, with no mysterious pretensions, for new ones, whose stability of character may be questionable.

I have found the plan answer very well, and as every one can make his own safety bottle, it were a pity that any chance of giving Tr. Opii for Tr. Rhei in the ordinary way of sale, should remain.

I propose to groove the stopper at opposite sides and then tie it into the bottle; the liquid leaves the bottle by the one groove and the air enters by the other; a little japanned tin cap, to fit over the stopper and neck of the bottle, is required to exclude the dust.

I will just give a few hints for doing this neatly; those who do not need them will, I have no doubt, excuse them, and to those who do I need not apologize. Place the stopper on a bench with one of the flat sides of the upper part resting upon a flat piece of wood of sufficient thickness to steady it, and hold it firmly between the fore-finger and thumb, then with a rat's-tail file dipped in turpentine, carefully make a groove on the crown of the arch; when this is done, turn the stopper over, and with a three-sided file make a smaller groove exactly opposite the first: the size of these grooves can only be determined by experiment, and it should be such as will permit a free, though not too free, escape of the contents: to use a familiar expression, it should allow a stream to run "as thick as a straw." When the grooves are made, the bottle should be filled, as the stopper will be a fixture; then place the stopper in the bottle with the smaller groove, cut by the three-sided file, exactly over the centre of the label: the reason for this is obvious; we pour from that side of the neck opposite the label, that it may not be injured by any of the liquid which may run down. The next thing to be done is to tie down the stopper, and this should be accomplished in such a manner, that the string cannot come off by accident; the string should not pass over the top of the stopper, but over the shoulder on either side, and then by "bracing the braces" with another bit of string, the stopper is made quite secure. Care must be taken that the string is not in the way of pouring out.

While writing, may I ask whether there would be any objection to the following plan for making Liquor Ferri Perchoridi? The object aimed at in the process of the Pharmacopœia appears to be to ensure a certain quantity of iron in a given bulk of the preparation, and this is done by starting with a definite substance, namely, iron in its elementary state; but the result of the process is not altogether satisfactory. Would it not be better to dissolve the iron in sulphuric Acid, then convert it into persulphate in the usual way with nitric Acid, and precipitate the peroxide with ammonia; this, having been carefully washed and drained, to be added to the whole of the hydrochloric acid, and evaporated to the proper bulk. No appreciable loss of iron takes place if due care be used in the washing. I cannot see what objection there can be to this process, if hydrochloric acid of proper strength be employed. A weaker acid would not contain sufficient HCl to convert all the Fe_2O_3 into Fe_2Cl_3, and, although a clear solution might be obtained, it would be because hydrated peroxide of iron is soluble in solution of Fe_2Cl_3. The extra trouble would not be worth consideration, if a perfectly satisfactory result were arrived at. I have tried the plan, and it appears to leave nothing to be desired, but I have not yet had time to examine it carefully, nor to test its keeping qualities when not tincture.

I am, Sir, your obedient servant,

Sydenham, December 23, 1864. T. H. HOLLOWAY.

A SIMPLE AND PRACTICABLE SUGGESTION FOR PREVENTING MISTAKES AND ACCIDENTAL POISONING.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The numerous suggestions for preventing accidental poisoning recorded from time to time in your Journal, for the most part appeal to the senses of feeling and seeing, either in the colour or shape of the bottle, a particular stopper or capsule, or arrangement of the label, many of which are very good,—and to such as are so, the simple suggestion I have to make, and which up to the present time appears to have been overlooked, may, I think, be added with advantage, viz. an appeal to the nasal organ. By smelling the contents of a bottle before pouring or taking from it, acts as a powerful check, and has this advantage over most of the suggestions that have been already made, viz. as most liquids have their own characteristic smell they are at once recognised, and if the bottle has been filled from a wrong stock-bottle the mistake is likely to arrest attention. I admit my suggestion is more applicable to liquids than to powders or crystals, but the negative or absence of smell in the generality of these would induce one to take another look at the label, and thus make a mistake less likely. Any one induced to carry out the above suggestion will in a very short time find himself habituated to the use of it, and if it should in one instance be the means of preventing a minor mistake than the sending out Tr. Opii for Mist. Sennæ Co., or Tr. Rhei Co., it will have amply repaid the trouble of the extra precaution adopted.

I remain, Sir, your obedient servant,
HENRY LONG.

Croydon, January 13, 1865.

ACCIDENTAL POISONING.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Will you kindly allow me to explain to Mr. Deane and others who have written on this subject, that the proposed Insurance Company which I am forming, and advertising in this Journal, is not open to the objection which he justly makes in regard to guaranteeing the amount of damages levied upon the chemist in cases of accidental poisoning. We propose to guarantee the *costs* of the *defence only*, which would, in cases of criminal prosecution, be the only expense to which the chemist would be put. It is obvious that if the public were well acquainted with the fact, that a poor chemist would always be provided with good counsel, etc., it would be no inducement whatever to proceed against him, and it would be a great boon when they did do so. There have been instances where the chemist would have been acquitted had he been thus provided, whereas he was unjustly punished through his inability to obtain an efficient defence.

I am, Sir, yours respectfully,
Rochester, December 15*th*, 1864. HENRY BARNABY.

PROPOSED LEGISLATION AND THE BENEVOLENT FUND.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Permit me to suggest, that as in the Pharmacy Act Amendment Bill it is proposed to admit chemists and druggists (non-members) to the benefits of the Benevolent Fund, a specially appropriate method of augmenting that fund is available (in the event of the Bill becoming law) by adding the fees received from registering these gentlemen to the amount already invested.

It appears to me that this course would satisfy the persons so registered, and convince them that the Society has no selfish motive. Moreover, the members of our own Society would be gratified by the addition of a handsome sum to the six thousand pounds now in hand for benevolent purposes.

Energetic action, in short, by the Council in reference to this point would, it may be reasonably thought, add largely to both the popularity and usefulness of the measure. I am, Sir, your obedient servant,

O.

London, January 24, 1865.

THE MEETING OF CHEMISTS AT GLASGOW.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The 'Chemist and Druggist' for this month contains a report of a meeting held in Glasgow, which is calculated to lead those who were not present to attach an importance to it which it is very far from deserving.

The facts are these:—After the meeting in the Trades Hall here, report of which appeared in the Journal for this month, Mr. Buott issued circulars for another in the Globe Hotel, calling personally on many of the trade and inviting them to attend. The result was a meeting consisting of twenty-five persons, employers and assistants; no great proportion out of a trade which numbers over three hundred members in this city.

After Mr. Buott had delivered the speech as reported, the chairman invited those present to express their opinion. No one seeming likely to come forward, he called on me to give my ideas on the subject; and it is amusing to see how the reporter, in condensing a discussion between Mr. Buott and myself which lasted more than an hour, has eliminated almost everything that could tell against the United Society and its Bill, or in favour of the Pharmaceutical Society.

Four persons voted for my amendment, that no bill is necessary. Desirous of ascertaining how many were in favour of the Pharmacy Bill, I wished to put a second amendment. This was, of course, out of order, and caused Mr. Moffat to make the remark, in the most friendly spirit however, "that I was confused from having sustained the whole discussion during the evening." Mr. Buott did not object to the second amendment being put, but a vote was not taken as the meeting considered that this would be irregular.

Mr. Taite's motion was then put to the meeting, when eight voted in its favour, the real majority of the meeting declining to vote. Mr. Buott addressed them, saying that he could not understand how gentlemen could refrain from giving an opinion one or other and that since the United Society had put itself to the expense of sending him down, he would not like to leave without some more definite result of his visit. It was in vain—the thirteen remained immovably silent. I do not wish it to be inferred, however, that these would have voted for the Pharmacy Bill. "Carried by a considerable majority" looks well in a printed report, but a statement of the numbers, eight against four, somewhat diminishes the effect.

Trusting rather to the gradual spread of education, for the elevation of our profession, and expecting sounder results from the continued efforts and example of the Pharmaceutical Society than could be obtained by any legislation, I was more anxious to defend the Society than the Pharmacy Bill, as I consider this was forced upon the Society by the threatened interference of the Medical Council.

If Parliament should think an Act of this kind imperatively called for, let us have the Pharmacy Bill by all means, as it is the only feasible measure yet brought forward. It interferes with the rights of no other trade, requires only the education of the individual, and permits every man to manage his business according to his own ideas of the exigeneies of his position. It registers the non-member on payment of a fee, and leaves him in peaee to earry on his labours as before, or to pass the examination, and join the Society if he chooses.

The bill of the United Soeiety, as interpreted by Mr. Buott, is an undignified clamour for a monopoly of the sale of certain articles; a humiliating deelaration that we are unable to withstand the eompetition of uneducated men, sueh as "huekstcrs," grocers, ete., without protective laws. It also contains a provision for electing eouneil, who are to have the power of dietating regulations for shop arrangements, ete.,—eertainly a most irritating attempt at meddling legislation. Sueh a measure is eertain to meet with the defeat whieh it deserves, but the attempt to introduce it will reflect diseredit on the trade.

The above is a summary of what I said at the meetings, and I have taken this opportunity of expressing my opinion of the rival bill, as my conduet at the two meetings appears contradietory, and requires some explanation.

I am, Sir, yours respectfully,

Alexr. Kinninmont.

THE CHEMISTS OF SALISBURY.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Dear Sir,—As the Local Seeretary for this eity, it has devolved on me during the past week to send the "Pharmaey Aet" to my brother chemists for perusal, and likewise the paper for their signatures, approving its eontents.

The Council solicits an expression of opinion on the said proposed "Aet;" I am glad, therefore, to be able to report, that all my brethren, whether members of the Pharmaeeutieal Society or not, readily attached their names to the doeument, and expressed their satisfaetion that at length there was a prospect of legislative action in behalf of ourselves as well as the public. Permit me, Sir, to add, that all legislation on the question should inelude these two—the interests of our trade or profession, and the safety of the public. I have regretted to see to what an extent this fact has been lost sight of in the abundant diseussions of the last few years. Just as the *true* interests of employers and employed are *one*, and any divergenee from this rule will sooner or later entail mischievous results, so, I take it, the *true* interests of the publie as purehasers, and of ourselves as vendors, whether of scientific ability or the mere retailing of drugs, etc., is one and the same.

This prineiple of mutual welfare, whilst applicable to trade as a whole, has a special bearing on ourselves, for ours is a business essentially of eonfidence. Society, in the long run, will give its preferenee to that man whose *character* and *trade arrangements* desire their eonfidenee. It is beeause the interests of both are preserved, that I eordially approve the seope and design of the "Pharmaey Aet."

But it is a souree of regret that a more cordial spirit of eo-operation does not exist amongst ourselves as chemists and druggists. We present another illustration of the sad truth, that "a man's foes are they of his own household." Our greatest diffieulty will not be the House of Commons or the nation, but our divided position before them both.

The "Pharmaey Aet," so far as I ean see, has been framed in a spirit of safe yet generous concession to those who are without our ranks. How the door could, in justice to those who had entered in previous years, or with a due regard to the safety of the publie, have been thrown open wider, I do not see.

I had hoped this spirit of conciliation would have been frankly reciprocated' on the part of "The United Society," but, judging from the tone of Mr. Buott's address at Glasgow, the 24th ult., we must not expect it.

I should be sorry to say anything that would tend to widen the breach between the two societies, for I feel that that man is rendering the most essential service to the movement who does everything in his power to heal the breach; but surely Mr. Buott's cause must be a weak one, when he can find nothing better to say than abusing the Pharmaceutical Society.

I am, dear Sir, yours truly,

S. R. ATKINS.

Salisbury, December 16th, 1864.

MINUTES OF THE TWELFTH ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION 1864.

The twelfth annual meeting of the American Pharmaceutical Association commenced its proceedings at the Hall of the Catholic Institute of Cincinnati, Cincinnati, on Wednesday, September 21st, 1864, at 3 o'clock p.m,—the President, Mr. J. Faris Moore, of Baltimore, Md., in the chair; Mr. H. N. Rittenhouse, of Philadelphia, acting as Secretary.

The Chair appointed a Committee on Credentials, who reported the following gentlemen as Delegates duly appointed to attend the present meeting:—

From the Massachusetts College of Pharmacy.—Messrs. H. W. Lincoln, R. R. Kent, Charles A. Tufts, A. P. Melzar, Thomas Hollis.

From the Philadelphia College of Pharmacy.—Messrs. E. Parrish, Evan T. Ellis, Wm. Procter, jun., Alfred B. Taylor, John M. Maisch.

From the Baltimore College of Pharmacy.—Messrs. J. B. Baxley, A. P. Sharp, J. Faris Moore, Wm. Caspari, H. A. Elliot.

From the Cincinnati College of Pharmacy.—Messrs. P. Reinlein, L. Gronewag, A. W. Fœrtmyer, O. Heineman, C. H. Bode.

The election of members having taken place, the Reports of the several Committees were read and adopted, and the officers for the ensuing year were appointed.

Answers to the Scientific Queries, proposed at the last meeting, were called for, and where the investigations were incomplete, the subjects were continued for another year.

The Committee presented the following queries for solution, which were accepted:—

1.—The seeds of *Cimicifuga racemosa* are numerous and easily obtainable. What are their characteristics, properties, and chemical constituents?

2.—*Gillenia trifoliata* and *stipulacea* are found extensively diffused throughout the United States. Their roots are known to resemble Ipecacuanha in medical properties. Could they be made to substitute that costly drug, and would Fluid Extract, Wine and Syrup of Gillenia be available for use as substitutes for the corresponding preparations of Ipecacuanha?

3.—The Salts of Sanguinarina are employed to a considerable extent in some of the western cities. How do they compare with the galenical preparations of the root, and what are their best combinations and modes of administration?

4.—Which process for Camphor Water is to be preferred, that of the U. S. Pharmacopœia or of the British Pharmacopœia?

5.—Could the Poppy be profitably cultivated in any part of the United States, for the production of Opium and Poppy-seed Oil?

6.—Can Citric Acid be profitably produced in this country, from Currants, Gooseberries, or Tomatoes?

7.—Can Peach Kernels be profitably used to procure the fixed and volatile Oil of Almonds?

8.—Commercial Honey is much adulterated with or substituted by artificially prepared Syrup. How can the fraud be detected?

9.—What is the best strength of Alcohol for the extraction of the several officinal Gum Resins, with a view to the production of eligible liquid representatives of the drugs?

10.—A good permanent preparation of Pumpkin Seeds (Pepo, U. S. P.), is a desideratum, with a view to its convenient use as a tænifuge remedy. What is the best, with a formula?

11.—What is the most convenient form of apparatus adapted to common use, for regulating the temperature at or below 160°, 140°, and 120° respectively, as directed in the evaporation of some of the officinal extracts?

12.—What are the causes of the decomposition of the Syrups and other Vegetable solutions, the best precautions to prevent it, and the best means of restoring such preparations which have deteriorated?

13.—In what preparations may Glycerine be used to prevent the deposition of apotheme? What is the minimum quantity that will answer the purpose, and will such preparations bear dilution?

14.—How far is Glycerine capable of substituting Alcohol in extracting drugs for pharmaceutical preparations? Would such substitution be economical?

15.—Is the cultivated Valerian, produced in New England, of equal quality with that imported from England and Germany, and are there any characteristic differences by which they may be distinguished?

16.—The so-called Naphtha or Benzine derived from the rectification of coal oil is very variable in properties. How far do these properties fit it for use in Pharmacy, and what are the relations, if any, of specific gravity and solubility among these hydrocarbons?

17.—What indigenous articles of the Materia Medica can be properly and profitably cultivated?

MISCELLANEA.

Accidental Poisoning by Digitalis.—On the 5th instant Henry Murney, son of the late Hon. William B. Murney, for years a member of the Legislative Assembly and Legislative Council; George Rankin, son of Mr. Arthur Rankin, M.P.P.; and Charles Scott, son of the late Mr. W. S. Scott, agent of Molson's line of steamboats, and brother of Mr. Scott, manager of the Express Company, who were staying at the Russell Hotel, stopped at the drug-store of Messrs. Sturton and Co., corner of St. John and Stanislaus Streets, and ordered a stimulating drink made of chemical compounds. The elder Mr. Sturton, who is reputed one of the best chemists in the province, was absent; but his son, who is his partner, was present, and made up the potions as ordered. Unfortunately, he mistook one bottle for another, and gave his patients a draught of digitalis—a deadly poison—instead of gentian, as he intended. The party had no sooner left the store than the effect of the poison began to manifest itself. Each of them complained, on leaving the store, that their fingers and the extremities of their toes were affected alike; that a burning sensation, as if pierced by needles, was troubling them, but did not suspect for a moment that they had been poisoned. Although the distance from Mr. Sturton's drug-store to Russell's Hotel is scarcely 100 yards, yet the deadly draught had such an effect that Mr. Murney fell twice from exhaustion before reaching Palace Street; and immediately after entering the hotel his companion, Mr. Rankin, fell senseless on the table in the reading-room. They were immediately conveyed to their respective rooms and medical aid called in. The noxious draught had, however, taken too deep a hold; and although Dr. Marsden and one or two other physicians were in immediate attendance, and the stomach-pump, with a free application of antidotes, were used, yet they were found of no avail. Mr. Murney, after suffering for an hour and a half, expired; while his friends, Mr. Rankin and Mr. Scott, lay in a very low condition, their medical attendant, Dr. Marsden, remaining with them all night. Mr. Scott and Mr. Rankin are now out of danger. The coroner's inquest has resulted in a verdict of "manslaughter" against Mr. Sturton, jun.—*Quebec Daily News.*

Growth of the Balsam of Peru Tree.—Seeds of the Balsam of Peru tree (*Myroxylon Pereiræ*, Kl.) transmitted by Dr. Charles Dorat, reached England in February, 1861, and young plants raised from them in English hot-houses are now from nine to fifteen inches high. Some of these seeds were sent to the Botanic Garden of Peradenia in Ceylon, whence Mr. Thwaites thus wrote in November last respecting the plants obtained from them:—"The largest plant I have of *Myroxylon Pereiræ* has a trunk *nine* *inches* in circumference close to the ground, and the largest of several branches into which it divides at about a foot from the ground is $11\frac{1}{2}$ feet long." In Jamaica and Trinidad, young plants derived from the same source have grown with great vigour. Those in the latter island are described by Mr. Prestoe, Director of the Botanic Garden (under date Dec. 8th, 1864) as "nearly five feet high: their aspect beautiful in the extreme. I do not remember to have seen foliage of a more glossy or darker green; and they will doubtless be, ere long, magnificent trees. The rapidity of growth in such plants in this country is something truly wonderful."

Growth of Cinchona in Jamaica.—Although numerous plants of Cinchona in this island have been lost, owing to the selection of an improper site for a plantation, a few which have been planted on the mountains at about 4000 feet above the sea-level have thriven with the utmost luxuriance. In a letter, under date 23rd December, 1864, just received, Mr. N. Wilson, Director of the Bath Botanical Garden (Jamaica), thus describes the rapid growth of some of the young cinchonas:—". . . I measured one lately and found it to be eight feet in height, seven inches in circumference at base of stem; and it had eighteen branches, some of them three feet long, with numerous laterals. In fact, nothing can exceed the progress of these plants, which, when I planted them three years ago, were but three inches in height."

Cinchona-Culture in the Himalaya.—The number of Cinchona plants in the Government plantations at Darjeeling, on the 15th July, 1864, was 19,516. This number includes 4904 plants of *Cinchona succirubra*, Pav., 172 of *C. Calisaya*, Wedd., 10,460 of *C. officinalis*, L., 1705 of *C. micrantha*, Wedd., and 2275 of *C. pahudiana*, How. No efforts are now made to propagate the last-named species, the bark of which is ascertained to be of inferior value.

Oil of Bergamot in the Treatment of Itch.—The 'Boston Medical Surgical Journal' states that M. Manfré, the venerable clinical professor in the University of Naples, has published in a Roman political newspaper, many articles on the rapid cure of itch. The best remedy, which he says he has thus far tried with complete success in his clinical service, is the oil of bergamot, which cures instantly, or at most in two minutes, even where the eruption is general. According to him, this remedy, more economical, less irritating, more prompt in its insecticide effects than Helmerich's ointment or sulphur, makes the wards appropriated for patients with this disease in hospitals superfluous; for a single friction over the whole affected surface is sufficient to effect a perfect cure. The patient may return home immediately after this application, the precaution being taken of making him change his clothing, or of thoroughly purifying that which he has worn. An ounce or two of oil of bergamot is enough to complete the cure. According to M. Manfré, the same remedy may be advantageously substituted for all those employed for the destruction of the *pediculus pubis*. For a long time physicians have known the insecticide power of the essential oils, and there may be found in some formularies many receipts of M. Aubé for the cure of itch in two minutes. The essential oil of turpentine mixed with essence of lemon, is the basis of the treatment recommended by this author. Before him, M. Gras had recommended the essential oil of lavender, which is quite analogous to that of bergamot, and has the additional advantage of not costing more than a quarter or half as much.—*Dublin Medical Press.*

REVIEWS.

Treatment of Diseases of the Skin. By Dr. William Frazer, Lecturer on Materia Medica to the Carmichael Medical School. Dublin: Fannin and Co. 1864.

Skin Diseases; their Description, Pathology, Diagnosis, and Treatment, with a copious Formulary. By Tilbury Fox, M.D. Lond.; Senior Physician to St. John's Hospital for Skin Diseases; Physician to the Farringdon General Dispensary; Author of 'Skin Diseases of Parasitic Origin,' etc. London: Hardwicke. 1864.

During the last few months, several works on Skin Diseases have been published in this country, indicating the increased interest which has arisen in so important a class of maladies. The subject is, however, of too exclusively a medical nature to be more than briefly alluded to in our pages; nevertheless, it is necessary that pharmaceutists should be well informed upon the various remedies employed in such diseases, and the formulas in common use. It is with this view more especially that we direct attention to the two works at the head of this notice.

The pages of the first work, as the author informs us, "are devoted to the consideration of the remedies most relied on in treating diseases of the skin: they are intended for the use of advanced students in our medical schools, and I trust will also prove of service to junior members of the profession." To such readers we can safely recommend this little volume as a useful and practical guide; and as it contains a good formulary, it will be found serviceable to all dispensers of medicines.

The treatise of Dr. Fox is of a more comprehensive character, as it comprises not only the Treatment of Skin Diseases, but also their Description, Pathology, and Diagnosis. Dr. Fox is evidently a good observer, as well as a practical physician, and has taken good advantage of the opportunities that have been afforded him for enlarging our knowledge of the pathology, diagnosis, and treatment of skin diseases. The work contains an interesting chapter on Parasitic Diseases produced by, or associated with the presence of animal parasites, and those in which vegetable parasites are concerned. In ascertaining the nature of these parasites, all good microscopists may do valuable service to science, and we have many such in our own body. The work concludes with a copious formulary, arranged under the heads of Baths, Soaps, Caustics, Astringents, Sedatives, Special Stimulants for Outward Application, Remedies specially adapted for Scabies, Mixtures, Pills, etc. The work reflects much credit upon the author, and cannot fail to enhance the reputation he has acquired in connection with skin diseases. The formulary will be found very useful to pharmaceutists and all engaged in the dispensing of medicines, as it contains directions for preparing many of the formulas now in common use by the principal practitioners, both at home and abroad, in the treatment of skin diseases.

THE PHILOSOPHY OF HEALTH; or, an Exposition of the Physiological and Sanitary Conditions conducive to Human Longevity and Happiness. By SOUTHWOOD SMITH, M.D. Eleventh edition, revised and enlarged. London: Longman and Co. 1865.

A work which has reached the eleventh edition is strong evidence both of the want of such a volume and of the capabilities of its author. Dr. Southwood Smith was well known as one of the first pioneers in this country in the important subject of Sanitary Reform, and a debt of gratitude is due to him and those who worked with him for first rousing the Legislature and Corporate Bodies to its necessity. The present edition, in consequence of the lamented death of the author, has been completed by his grandson. The work was originally written from a "conviction of the importance of a more generally diffused physiological knowledge." Thus the author says:—"My introduction will consist of an argument to show that a knowledge of the structure and functions of the human body, irrespective of the pleasure arising from the study as a most interesting branch of science, is necessary to a rational care of health; and that it is absolutely indispensable to those who have the charge of the health and well-being of others, from the mother and the nurse to the educator—to the heads of families—to the heads of large establishments, whether public or private, most especially to officers, generals, etc., as the guardians of the health and efficiency of the soldiers—to local authorities—and last, but by no means least, to the legislator, as the framer of laws for the regulation and administration of Public Health."

With all this we cordially and entirely agree, and we hope the time is not far distant when pharmaceutists especially, will be called upon to possess a general knowledge of the structure and functions of the human body. We do not mean that they should be skilled anatomists and physiologists, for such a knowledge could only be gained by laborious study, which would lead them too much from the more important studies of their profession,—but simply grounded in general principles and their application in the preservation of health and prevention of disease. Although the author did not live to carry out fully his design, the work is just one of those which is adapted for the members of our own body, and as such we cordially recommend it to their careful perusal and study.

The Chemist's Desk-Companion for 1865.—The Year-Book of Pharmacy: a Practical Summary of Researches in Pharmacy, Materia Medica, and Pharmaceutical Chemistry during the Year 1864. By Charles H. Wood and Charles Sharp.

This little work, as stated in the Introduction, "is intended to furnish the pharmaceutist with a concise abstract of all important papers bearing on Pharmacy which have appeared during the past year." It is the first attempt at the establishment of a work of the sort in this country, although for many years similar publications have appeared in France, Germany, and America, and we have no doubt its appearance will be hailed with satisfaction by those who, being engaged in the practice of pharmacy, feel the want of a ready means of referring to a brief account of all new matter relating to their profession. The authors are known to many of our readers, one being the Librarian to the Pharmaceutical Society, and the other late Demonstrator in the Laboratory and Secretary to the Chemical Discussion Association. They are well qualified for the task they have undertaken, and have well performed their task. The work, which consists of a pamphlet of 155 pages, gives a brief notice of the state, political and social, of pharmacy in this country during the past year; it then gives in a series of short articles the results of the communications which have been made in the different journals on Materia Medica, Pharmaceutical Chemisty, and Pharmacy, and these notices are followed by pharmaceutical formulæ, and therapeutical notes and formulæ. The whole is concisely yet clearly expressed, with full references to the sources from which the information is derived. It will be found to be a very useful, and at the same time inexpensive, appendage to the desk of the dispensing chemist.

OBITUARY.

On Wednesday, November 23rd, at 10, Parade, Tunbridge Wells, William Maddock, in his seventy-third year; one of the founders of the Pharmaceutical Society.

BOOKS RECEIVED.

The Half-Yearly Abstract of the Medical Sciences. Edited by W. H. Ranking, M.D., etc., and C. B. Radcliffe, M.D., etc. Vol. LX., July-December, 1864. London: John Churchill and Sons, New Burlington Street. 1865.

TO CORRESPONDENTS.

Registered Apprentice (Bradford).—See Wood and Bache's 'United States Dispensatory,' p. 1443, and 'American Journal of Pharmacy,' vol. xxviii. p. 510. A paper will shortly appear on the subject by Professor Bentley in the Pharmaceutical Journal.

J. B. (Glasgow).—See "New American Remedies," in the Pharmaceutical Journal, by Professor Bentley. New papers will shortly appear.

S. J. F.—*Methylic Alcohol.* See Vol. V. (2nd series), page 369.

C. & D.—The apparatus referred to would answer the purpose.

S. P. (Darby).—We are unable to give the information required.

J. H. W. (Blackheath).—In the prescription referred to, *Potassæ carbonas* should be used.

W. R. S. (Manchester).—If our correspondent means *carbazotic acid*, this has recently been tried in some cases where the use of quinine is indicated; but we understand that the property possessed by carbazotic acid, of colouring the skin, is some objection to its use.

Instructions from Members and Associates respecting the transmission of the Journal before the 25th of the month, to Elias Bremridge, Secretary, 17, Bloomsbury Square, W.C.

Advertisements (not later than the 23rd) to Messrs. Churchill, New Burlington Street. Other communications to the Editors, 17, Bloomsbury Square.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VI.—No. IX.—MARCH 1st, 1865.

QUESTIONS RELATING TO THE PHARMACY BILL.

It could not be expected, and certainly was not desired, in appealing to the body of Chemists and Druggists for their opinions on the proposed extension of the Pharmacy Bill, that simple assent or dissent should be expressed. There must be many differences of opinion on such a measure, many doubts entertained with reference to the probable effects of specified provisions or the best means of accomplishing desired objects, and difficulties experienced in forming settled opinions upon some of the questions that necessarily arise. The full and free discussion of the subject is calculated to dispel erroneous notions, to give a definite character to expressed opinions, and to reduce the number of essential differences among those most interested in the issue. We believe much good has arisen in this way from the agitation throughout the country of the merits of the proposed Bill; but we cannot say, nevertheless, that the results or the general tendency of the discussions, as reported, have always appeared just and satisfactory.

In the meeting of Chemists and Druggists at York, although a preference was expressed for the Bill of the Pharmaceutical Society over that of the United Society of Chemists and Druggists, yet neither Bill was adopted in an unaltered form, and the propositions that were made for amendments in some of the clauses were accompanied by remarks which we cannot allow to pass unnoticed. It was freely admitted that the Pharmaceutical Society, being an incorporated and legally recognized body, would, on these accounts, have an advantage in claiming the attention of the Legislature to their proposed measure. But then it was stated that the Pharmaceutical Society was a small body compared to the great mass of Druggists in the country; this remark being apparently made with the view of disparaging the claim to support which might be urged in favour of the Bill emanating from and supported by the Society.

We have shown on a former occasion (March, 1864, page 383) that the members of the Pharmaceutical Society constitute fully one-third of the whole number of Chemists and Druggists throughout the country. This calculation is founded, not upon the vague and absurd statements which have been made by some persons, who have represented the number of Chemists and Druggists at 30,000, and even at 40,000, but upon the more reliable data furnished by the Registrar-General in the census returns. There were only 12,638 persons of twenty years of age and upwards who, according to the census of 1861, were engaged in the practice of pharmacy at that time in England and Wales, and this number includes apprentices and assistants as well as principals. Now, in London there is one Druggist to every 3500 of the population, and if the same proportions prevail throughout the country, this would give 5700 as the total number of Chemists and Druggists engaged in business on their own account.—a number which corresponds very well with the proportion that may be supposed to occupy the position of principals out of the 12,638 Druggists of all sorts returned at the census.

It may be said, it is true, taking the whole number of Chemists and Druggists at 6000, that the two thousand and odd Pharmaceutical Chemists, who are incorporated and recognized by Act of Parliament, form but a minority when compared with those who are outside the Society. But there are other points to be considered in estimating the position and influence of the Pharmaceutical Society besides the mere numerical relation which its members bear to the total number of Chemists and Druggists. The Pharmaceutical Society represents a principle, and its members acquire an influence which the recognition of this principle is calculated to give them. The basis of membership in this Society is professional qualification, and one of the principal objects of the Society has been to raise and equalize the standard of qualification not only among its own members, but also among the members of the trade generally. It is something to be able to show that the Pharmaceutical Chemists, who number more than two thousand, and constitute one-third of the entire body of Chemists and Druggists, have for upwards of twenty years been the promoters and supporters of the only systematic arrangement existing in England for providing efficient professional instruction to those who are engaged in the practice of pharmacy, and for testing the knowledge of such as claim the confidence of the public on the score of professional acquirements. It may no doubt be said, as it has been said, that many—nay, a majority, of the members of the Society have never been examined. and are no better than some who have not joined the association. The admission of such men prior to 1853 was a matter of necessity for the foundation of the Society ; but even these can claim the merit of having recognized the principle referred to, of having contributed to support a system of education, of having to the extent of their power as men already in business partaken of the means of education and improvement provided, and of having been for twelve years or more engaged in business on their own account. If all these circumstances be duly considered, and if, moreover, the position occupied and the business done by the leading members of the Pharmaceutical Society in the principal towns throughout the country be taken into the account, it will be found that neither in numbers nor in the influence which its members possess, can the Society be justly represented as an unimportant body, or as only a small section of the Chemists and Druggists of England.

But it has been further stated that the Pharmaceutical Society has neglected the interests of the body they pretend to represent, and that they have even *conspired* to sacrifice the interests of their brethren by handing them over to the tender mercies of the medical profession. This is a very unjustifiable imputation, for which there is no ground whatever. The Society can confidently appeal to the results of their operations since 1841 for abundant evidence of the zeal and consistency with which they have watched over, fought for, and maintained the interests not only of their own members, but of those of their brethren who have not been associated with them.

With reference to the amendments proposed to some of the clauses of the Bill by the meeting at York, we think they are neither judicious nor just. The exclusion of the present race of apprentices from the necessity of passing the proposed examinations, and the admission of all existing Chemists and Assistants into the Pharmaceutical Society on the mere payment of the annual subscription, without any other condition being required, would have the effect of undoing much of the good which has resulted from the past labours of our Society, and of throwing back to a still distant period the attainment of the object for which we have so long been working, and which the proposed further step in Pharmaceutical legislation contemplates. We can hardly think the proposers of these so-called amendments could have fully understood their bearing, or, if they did, that they could have seriously supposed they would be acceded to. The Bill as it stands provides that all existing Pharmaceutical Chemists and Druggists should have the rights and privileges they at present possess secured to them, but the proposed amendments would have the effect of lowering the position of the Pharmaceutical Chemist without elevating that of the Chemist and Druggist.

We are glad to find that while we have some lukewarm friends within our own body, we have influential advocates without, whose assistance may be of the greatest importance to us. The 'Lancet' of February 25th states as follows:—"The President of the Medical Council has addressed a communication to the Home Secretary commendatory of the objects of the Pharmacy Bill. The Secretary has returned a reply of a courteous and official character. The Pharmaceutical Society has also addressed the Home Secretary on this subject. On the whole, the sentiments of the Government are, we believe, friendly towards this useful and valuable reform, which will assist to elevate the standard of Pharmaceutical education, and improve the guarantees for the security of the sick, without infringing on any existing rights."

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *February 1st*, 1865,

Present—Messrs. Bird, Bottle, Davenport, Deane, George Edwards, J. B. Edwards, Evans, Hanbury, Haselden, Hills, Morson, Orridge, Savage, Squire, Watts, and Waugh,—

The following Pharmaceutical Chemists were elected

MEMBERS.

Altrincham ....Holt, William Henry.
Brentwood ....Guest, Edward Percival.
London..............................Booth, Samuel.
" ....Nosworthy, Robert.
" ....Richards, Edwin.
" ....Salman, Thomas.
Peckham ....Taylor Thomas.
Liverpool ....Young, Robert Fisher.
Plymouth...........................Sloggett, Thomas Chubb.

ELECTION OF COUNCIL.

The lot having been taken, the following Members were declared to go out of office but are eligible for re-election:—

Bird, William Lionel, 42, Castle Street, Oxford Street.
Bottle, Alexander, 37, Townwall Street, Dover.
Edwards, George, Dartford.
Edwards, John Baker, Royal Institution, Liverpool.
Evans, Henry Sugden, 52, Hanover Street, Liverpool.
Haselden, Adolphus Frederick, 18, Conduit Street.
Hills, Thomas Hyde, 338, Oxford Street.
Orridge, Benjamin B., 30, Bucklersbury.
Proctor, Barnard S., 11, Grey Street, Newcastle.

Reynolds, Richard, 13, Briggate, Leeds.
Sandford, George Webb, 47, Piccadilly.
Standring, Thomas, 1, Piccadilly, Manchester.
Watts, William Manning, 32, Whitecross Street.
Waugh, George, 177, Regent Street.

The following Members remain in office for the ensuing year :—

Deane, Henry, Clapham.
Davenport, John T., 33, Great Russell Street.
Hanbury, Daniel Bell, Plough Court, Lombard Street.
Mackay, John, 121, George Street, Edinburgh.
Morson, Thomas N. R., 38, Queen's Square.
Savage, William Dawson, 65, Edward Street, Brighton.
Squire, Peter, 277, Oxford Street.

The sum of £500 was ordered to be invested to the General Fund Account.

EXAMINATION, *February 15th*, 1865.

MAJOR (Registered as Pharmaceutical Chemists).

Barrett, James ....Leicester.
Isherwood, James ....London.
Preston, Joseph Classon .... „

MINOR (Registered as Assistants).

Quinlan, Joseph ....London.
Payne, Martin Henry..Bridgewater.
Whysall, William ....Belper.

REGISTERED APPRENTICES.

Name.	Residing with	Address.
Cheesman, John	Mr. Pearman	Newport, Monmouthshire.
Turner, William Henry	Mr. Stroud	Bristol.
Ward, John Slinger	Mr. Brayshay	Stockton-on-Tees.
Warrior, Henry	Messrs. Maud and Wilson	Bradford, Yorkshire.

EXAMINATION, *February 22nd*, 1865.

(Registered as Pharmaceutical Chemists.)

Tugwell, William Henry ....Greenwich.
Whiteway, William Henry ....Torquay.

REGISTERED APPRENTICES.

NAME.	RESIDING WITH.	ADDRESS.
Sadler, George Edward	Mr. Watson	Leicester.
Wood, Alexander	Mr. Wood	New Brentford.

(EXAMINATION IN EDINBURGH, *14th February*, 1865).

(Registered as Pharmaceutical Chemists.)

Currie, John.. Glasgow
Francis, John ....Wrexham.
Williamson, James ....Edinburgh.

BENEVOLENT FUND.

The sum of £20 was granted to the family of a distressed member of the Society, in the South of England.

The sum of £150 was ordered to be invested in Consols to the Benevolent Fund account.

SUBSCRIPTIONS RECEIVED DURING JANUARY AND FEBRUARY:—

LONDON.

	£	s.	d.
A. M.	1	0	0
Anderson, Charles, 23, Lower Belgrave Street	1	1	0
Barnes, James B., Knightsbridge	0	10	6
Barron, Harvey, Becket, and Simpson, 6, Giltspur Street	2	2	0
Binge, Thomas, 23, Stockbridge Terrace	0	10	6
Bird, W. L., Castle St., Oxford St.	1	1	0
Blake, Sandford, and Blake, 47, Piccadilly	1	1	0
Booth, Saml., 33, Carrington St.	0	10	0
Bourdas, Isaiah, 10, Pont Street,	1	1	0
Buckle, Christopher F., 77, Gray's Inn Road	0	5	0
Butt, Edward N., 235, Oxford St.	0	10	6
Cracknell, Charles, 107, Edgeware Road	2	2	0
Croyden, Chas, 37, Wigmore St.	0	10	6
Davies, Henry E., 43, Wood St.	0	10	6
Dinneford and Co., New Bond St.	2	2	0
Elvey, Thomas, 8, Halkin Street West	1	1	0
Evans, J. H., Bartholomew Close	1	1	0
Fisher and Haselden, Conduit St.	1	1	0
Foott, Richard R., 8, Lower Eaton Street	0	10	6
Goodbarne, Thomas, Hoxton	0	10	6
Goodger, David, 31, Regent St.	0	10	6
Gristock, Thomas, 42, South St.	0	10	6
Groves, E., 4, Bernard Street, N.W.	0	10	6
Herrings and Co., Aldersgate St.	2	2	0
Hill and Son, 11, Little Britain	2	2	0
Hodgkinson, Tonge, and Head, 213, Upper Thames Street	2	2	0
Hopkin and Williams, 5, New Cavendish Street	2	2	0
Kemp, Robert, Holloway Road	0	10	6
Kernot, George Charles, Poplar	0	10	6
Kershaw, George, Camden Town	0	10	6
Lescher, Joseph L., Bartholomew Close	1	1	0
Low, Wm. Francis, Wimpole St.	1	1	0
Mathews, Wm., 1, Wigmore St.	0	10	6
Morris, Henry, St. John's Wood	1	1	0
Nicholson, Frederick, Highbury	1	1	0
Orpe, Thomas M., 329, Old Kent Road	0	10	0
Palmer, Robert, Ovington Sq.	1	1	0
Quiller, Charles R., Sloane Sq.	0	10	6
Roach, Pope, St. James's Street	0	10	6
Snelling, Francis, 23, Farringdon Street	1	1	0
Starkie, Richard S., 4, Strand	1	1	0
Tippett, Benj. M., 3, Sloane St.	0	10	6
Tupholme, John J., 38, Lamb's Conduit Street	0	10	6
Turner, Richard, 2, Oxenden St.	0	5	0
Urwick, William M., 60, St. George's Road	1	1	0
Vizer, Edwin B., 63, Lupus St.	1	1	0
Whitburn, Augustus R., 174, Regent Street	0	10	6
Williams, Joseph J., Harrow Rd.	0	10	6
Wilson, Thomas, Upper Holloway	0	10	6
Wooldridge, John, 290, Euston Road	0	10	6
Wright and Francis, 11, Old Fish Street	1	1	0

COUNTRY.

	£	s.	d.
Ashby-de-la-Zouch, Redfern, John	1	1	0
Barnstaple, Goss, Samuel	0	5	0
Berwick, Carr, William Graham	0	10	0
Beverley, Robinson, James Mowld	0	5	0
Bishop Stortford, Grounds, George Field	0	10	0
Brighton, Noakes, Richard	0	10	6
Brighton, Robson, Thomas	0	10	6
Chichester, Pratt, John	0	10	6
Gravesend, Spencer, Charles	1	1	0
Harleston, Muskett, James	0	5	0
Hartlepool, Farrar, William	0	5	0
Hirwain, Sims, Joseph	0	10	6
Ilford, Beal, Edmund John	0	10	6
Ingatestone, Stuart, Henry J.	0	10	6
Kidderminster, Bond, Charles	0	6	0
Liverpool, Mercer, Nathan	0	10	6
Maidstone, Argles, Robert	0	4	0
Manchester, Mitchell, John	0	10	6
Norwich, Arnold, Edward	0	5	0
Odiham, Hornsby, John H.	0	5	0
Oldham, Bagshaw, William	1	1	0
Pembroke Dock, Saer, David P.	0	10	0
Portsmouth, Parsons, William	0	10	0
Rochdale, Mercer, Thomas Wm.	0	5	0
Shildon, Veitch, William	0	10	6
Sittingbourne, Gordelier, Paul W. G.	0	10	6
Southsea, Rastrick and Son	0	10	6
Stockport, Brooke, Frederick	1	1	0
Stockport, Shaw, Alexander H.	1	1	0
Tickhill, Crowther, Thomas	0	10	6
Torquay, Whiteway, Wm. Henry	1	0	0
Wellingborough, Thorne, John	0	5	0
Weymouth, Groves, Thos. B.	0	10	6
Winchester, Powell, Edward	0	10	6

DONATIONS.

	£	s.	d.
Atkins, Francis Thos., Deptford	2	2	0
Bailey, Delamore J., Conduit St.	5	5	0
Gamble, Richard, Grantham......	5	5	0
Goddard, Joseph, Leicester	5	5	0
Holt, Wm. Henry, Altrincham...	5	5	0
Horner and Sons, Bucklersbury	10	10	0
Newbury, Francis and Sons, St. Paul's Churchyard	10	10	0

PHARMACEUTICAL MEETING.

Wednesday, January 4th, 1865.

MR. T. H. HILLS, VICE-PRESIDENT, IN THE CHAIR.

The following papers were read:—

ON THE KOLA-NUT OF TROPICAL WEST AFRICA.

(*THE GURU-NUT OF SOUDAN.*)

BY W. F. DANIELL, M.D., F.L.S.,

HON. MEMBER OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

It would probably prove a futile task, to attempt the discovery throughout the vegetable kingdom of tropical West Africa, of any analogous product that occupies such an exalted position in the social, or dietetic economy of the negro tribes, or constitutes such an important article of traffic in Soudan, as the seeds of the Kola-tree (*Cola acuminata*, R. Br.). With the majority of the aboriginal races populating that vast extent of territory, comprehended between Senegambia to the north, and the province of N'gola southward of the equator, these fruits have from time immemorial been held in inestimable value, and their virtues so highly prized, that their employment has become an indispensable and permanent luxury. Within the last few centuries, however, their use has been even still more extensively diffused, and to such a degree as to excite a large commercial intercourse to spring up, between the coastal districts, and the regions of Central Africa, or Soudan. This profitable trade has been carried on both by Pagan and Mahomedan merchants, by the latter especially into more remote countries beyond the Sahara, so that for many years these valuable commodities have been offered for sale in the markets of Fez, Tripoli, and other local depôts, on the shores of the Mediterranean.

The first Portuguese adventurers, in their exploration of the coasts of Western Africa, were soon made aware of the great repute in which this produce was regarded, and taking advantage of the circumstance, they without delay commenced collecting considerable quantities of these seeds, from their stores in the Congo, and Isle of St. Thomas, and supplying various trading factories in other portions of the coast; and thus by retailing them at a great increase of price, managed to secure a monopoly for a long succession of years, which perhaps, of all the indigenous products of local commerce, proved to be the most lucrative.

Implicitly crediting the assertions of the natives that their usage was viewed as a luxury, exclusively reserved for the chiefs, and richer classes of people, and merely as a means for rendering water sweet, and palatable, when drunk before, or after meals, (a fact confirmed from their being observed masticating the seeds, more or less throughout the day), they (*i. e.* the Portuguese) never entertained the most remote idea, of investigating the causes of this extraordinary uniformity of demand, or rather special craving of the human system, for a nitrogenous substance, that would tend to compensate for the void caused by the deficiency of animal food; for in West Africa, as in other countries, the flesh of animals is scarce, and difficult to procure. Hence the induction of a peculiar instinctive law, which has led the negro and other uncivilized races to select, as if by intuition, such products of the vegetable kingdom, as contain a predominance of highly azotized elements, to supply the waste of the human frame; and to this inordinate desire for a diet, chiefly composed of nitrogenous constituents, they appear to have been guided by an importunate constitutional want.

Prior to entering into any general details, we may briefly advert to a few of the more prominent aboriginal customs, which from their ordinary occurrence, could not but fail of attracting the attention of Europeans, to the marked popularity attending the use of these nuts.

Should a white trader, or native personage of rank, visit any chief, whether of ceremony, or otherwise, the presentation of a few seeds, or even the half of one, constitutes the highest compliment he could receive, as conveying an assurance of friendly welcome, and protection.

If a chief or man of property residing at some distance from another, felt inclined to perform an act of courtesy to the latter, the transmission of a few Kola-nuts was esteemed as the most grateful indication of friendship, and was almost invariably reciprocated by a similar exchange or acknowledgment.

In countries where the Kola-tree was not indigenous, and the fruit therefore difficult of attainment, being more restricted to the chiefs and higher inhabitants, no business could be transacted without a few of the nuts being previously eaten: and so high was their appreciation, that formerly no marriage gift of the bridegroom to the father would be deemed acceptable for the purchase of his daughter, unless it comprised a considerable amount of the Kola-seeds.

The fetishman, or necromancer, desirous of raising the shadow of the dead from its earthy tabernacle, to satisfy the caprices of some importunate votary, completed the potency of his spells, by the addition of the food it loved best when in the human body.

In all propitiatory offerings made to the malign god of the earth, to avert disease, misfortune, or ensure a bountiful harvest, they formed by far the most important ingredient in these magic oblations.

When two belligerent tribes were on the eve of war, prior to the committal of any act of hostility, the Kola-nut often acted the part of a mediator, or herald, to determine the future intentions of one, or both parties. On the centre of an elevated mound of earth, on some neutral boundary, or piece of land, two red, and one white Kola-nut, the latter divided into two pieces, were deposited. If one of the red nuts was taken by either tribe, it was a declaration of war; but if only half of the white was removed, it was deemed as an indication of peace, and thus answered all the purposes of a proclamation, which, being officially promulgated, was regarded of most sacred import by either party, and both therefore subsequently mingled freely, to adjust their dispute, without the danger of treachery.

Again, on the departure of any guest, the host was bound to bestow on him a farewell gift of Kola's. To not a few of these visitors, induced by commercial, or political objects, to traverse great distances, no present could be more deeply valued; for experience had already demonstrated, that their use not only supported the strength, allayed an inordinate appetite, assuaged thirst, and promoted digestion, but in fact rendered them more capable, of sustaining the fatigues of their homeward journey, than any other product that could be obtained.

It is somewhat curious that the Portuguese, Dutch, and at a later date, the English voyagers, imperceptibly fell into the negro predilections for this fruit: and eventually, from continual addiction, their urgency as a stimulus became so habitual, that the due gratification of this want was established as a matter of imperative necessity. Indeed in later years, it was thought they were endowed with the flavour and qualities of the Peruvian bark.

E. Lopez, one of the earliest Portuguese adventurers, writing on this product, avers that it was the fashion in his day for the negro's "to hold them in their mouths, and chew, or at least eat them for the quenching of their thirst, and better relishing of their water. They comfort and preserve the stomach, but above all other virtues, they are singularly good against diseases of the liver. And it is said the liver of a hen, or any other bird that is putrified and stinketh, being sprinkled with the matter of this fruit, returneth to its former state, and becomes fresh and sound again."* In further evidence of the popular esteem they commanded at apparently such a distant age, we may allude to the custom mentioned by a Capuchin missionary, Jerome de Sorrento, in his voyage to the Congo, that when any gentleman of St. Paul de Loando (the metropolis of the Portuguese possessions in South-West Africa) was desirous of paying a compliment to any lady he met in the streets, he offered her a present of a few of these nuts. It was evident even at this date that some peculiar stimulant property was manifested, otherwise it would be difficult to account for the subtle influence they exercised on the human economy. That the taste for them was acquired there can also be but slight doubt, for the bitter astringency of the nuts was far from being pleasant, or palatable at first, to those unaccustomed to their use.

Another point should always be kept in view, viz. that they were not specially reserved for meals or bad water, but usually carried in the hand of the owner whilst pursuing his ordinary avocations; small fragments being masticated at intervals, and the pulp, after the extraction of their juice, thrown away. This addition to their daily habit, brought under their cognizance the remarkable faculty they possessed in causing insomnia, or want of sleep, and this property the natives probably rendered available in protracting the festivities of their midnight orgies. In other respects the best, if not the most useful, application the Portuguese made in a practical point of view, was the extraction of a beautiful yellow dye from the fresh seeds, by a process still in vogue among several aboriginal tribes, in proximity to their ancient colonial settlements.

Another interesting feature connected with the primitive nomenclature of this plant, is the origin of the term Kola, and its widely-spread diffusion along the shores of Western Africa by this designation,—a fact which did not escape the notice of that celebrated botanist, Robert Brown. From the earliest records relative to the discovery of the Congo in which we find the seeds and tree being described by this name, we might reasonably infer, that it was either of Congoese, or Portuguese derivation. Respecting the latter, I may remark that during a long residence in the districts of the Congo, I never knew their inhabitants to acknowledge any other title, than that of *Makasso*, or *Makatso*, that of *Kola* being unknown. I had formerly been under the impression that this appellation might claim its descent from an M'bunda source, but ample inquiries since instituted among the people of N'gola, have satisfied me that my surmises were destitute of foundation. It must, however, be expressly understood that this designation is only recognized by European traders, and negro tribes in the immediate vicinity of colonies, originally founded by the Portuguese. It is neither appropriated, nor employed by any other of the populations of the most distant, or even adjoining countries, each of which has its own vernacular name, distinctive from any other. Perhaps the most feasible explanation, is that furnished by the Foula traders, who occasionally visit Sierra Leone, and which, to me, appears to be the real source of the term. They candidly affirm that it is simply a vernacular negro corruption, *Gola* or *Kola* being deduced from that of *Guro*, or *Goro*, a Foula, and Soudan designation. Many centuries since, a very lucrative commerce was established in this article, large trading caravans coming from the interior to the Timmané markets to purchase this commodity; hence the tribes in the maritime regions, unable from physical defects of the vocal apparatus to

* Pigafetta, 'Relatione del Reame di Congo,' etc., 1591.

articulate the letter "*r*," were compelled to adopt that of "*l*;" so that the word *Guro*, or *Goro*, became converted into that of *Gola* or *Kola*, the substitution of these, and, in fact other letters, being of proverbial occurrence, to those conversant with the African languages. This modified term was ultimately adopted by the Portguese, first in the neighbourhood, but long antecedent to the foundation, of the colony of Sierra Leone, and within a brief period, after the discovery of the river of the same name. In this locality they were actively engaged in accumulating cargoes of the Kola-nut by means of numerous small vessels detached to different portions of the coast for this purpose,—a custom continued so late as the commencement of the present century, and mentioned by Afzelius, in his report on the vegetable resources of the infant settlement of Sierra Leone for 1794.

From the great reputation these nuts had acquired, previous to the sojourn of the English in West Africa, we may suppose that no length of time elapsed, before they adopted the example of their predecessors. In the old books of ravels, we may observe various descriptive details, in which their virtues, and qualities are conspicuously extolled. Premising that the following remarks pertain more to the Senegal, and Gambia rivers, where this production is not indigenous, as affording perhaps the most appropriate illustration of what may be termed the most invaluable of all the negro luxuries. It had been noticed by the English traders, among the Mandingo's of the Gambia, that in their limited traffic with the inhabitants of the interior, they carried with them large quantities of salt, either of native or foreign manufacture, and received in exchange gold dust, and a roundish, compressed, bitter nut, resembling a European chestnut, and known by the appellation of *Gola*, or *Kola*. They were purchased after a toilsome journey, a great distance inland. They were considered of such inestimable value that ten were thought to be a gift worthy of a king, and that for the moderate number of fifty, a man might purchase a wife out of the best families in the kingdom. Nay, the elder and wealthier people, rather than be deprived of this luxury from loss of teeth, proceeding from the decrepitude of advanced age, carried with them a small pestle and mortar, by the aid of which, they reduced the nuts into a form of powder; and, by occasionally placing small portions on their tongue, thus secured all the benefits which would have accrued, if the nut had been eaten entire.

Jobson, an English merchant, who was a resident in the Gambia about 1620, launches forth into fulsome encomiums on their properties, especially so when he relates that after mastication, they rendered river-water so sweet as to make it resemble white wine mixed with sugar, and that its dulcificant powers extended equally to tobacco. Modern experience, however, has not indorsed such extravagant assertions. He further states that six of these seeds were esteemed a present of special consideration, when transmitted to European factors on the Gambia. He also appears to have been acquainted with the fact that the Portuguese, even in his day, furnished the inferior course of the river, through communicating creeks, with this fruit from their factories at Bissao and Cadico, these again being supplied by imports, from the fertile regions in the neighbourhood of Sierra Leone and elsewhere.

Afzelius, in the botanical report previously alluded to, includes among the medicinal plants of the colony, the "famous fruit" of the Kola, which, he observes, was so highly prized by the natives that they attributed similar remedial virtues to it as to the Peruvian bark; and a subsequent official report of the African Institution, announces that the tonic qualities of these nuts had become so well known, that the travelling merchants in the vicinity of Sierra Leone, had exported them to every portion of the Continent, even to such remote countries as Egypt, and Abyssinia!

Since that time, few volumes of travels or discoveries in West or Central

Africa, have been published which do not contain a casual reference to, or brief description of its popular appliances, gleaned in most instances from secondary authorities, being merely the old stereotyped phrases, referring to its employment to alter, or correct the taste of bad, and unwholesome water, and allay the sensations of hunger.

It is certainly remarkable that the Kola-nut, endowed with such a distinctive fame, and such a widely-spread popularity throughout a considerable portion of the African continent, should have gained merely a trivial appreciation, or be so slightly noticed in our botanical treatises. What little they do mention consists, for the most part, of reiterations of worn-out and often incorrect statements, culled from the works of old travellers and others. Some of these authorities go so far as to confidently declare that half-putrid water, by means of the entire or half-chewed seeds deposited in jars, had been converted into a pure and agreeable liquid. No statement could be so far from the truth. This error had doubtless proceeded from the circumstance, that it is necessary for their preservation, to retain them for a short period daily in water, otherwise they would become dried up, and lose their essential qualities. With the object, therefore, of testing the value of this supposed purificatory influence in the West Indies, I placed a few of the fresh seeds in a large tumbler of stinking river-water; no change was perceived until after a few days, when a quantity of ropy mucus was generated, which, so far from assisting in the removal of the fœtid effluvia, had quite the reverse effect, the incipient decomposition of the seeds themselves, increasing the offensive odours.

The introduction of the Kola or Guru-nut into the kingdoms of Northern Africa, may be assumed to be of a comparatively modern epoch, for little, if any, mercantile connection was held with the pagan tribes, until after their conversion to Mahommedanism by the Arab, or Berber invaders. The first mention I can trace, relative to this plant, is in the travels of Leo Africanus, who explored a large extent of Central Africa, about the middle of the sixteenth century. He briefly adverts to the fact, that no trees were observed in the territory through which he passed, but a few of great size, yielding a bitter fruit resembling a chestnut, and denominated by the inhabitants *Goro* or *Guro*.*

From this period, until that of Lucas's visit, to Northern Africa in 1797, no valid information respecting their intervening history has been promulgated, worthy of credit. Lucas's account of these nuts teems with descriptive errors, so that but little reliance can be placed on his statements, evidently gained from secondary sources. Under the Soudan term of Guru-nuts, he enumerates them with gold dust, slaves, and other products, among the usual articles of commerce, imported by the Fezzan merchants, from the negro states south of the Niger. They were esteemed a pleasant bitter, and became so grateful to those familiar with their employment, as the means of changing the brackish, and unwholesome waters of Fez, into a more palatable drink, as to be considered of essential importance to the comforts of life.

Lyons, and subsequently other travellers, supply far more accurate and trustworthy knowledge of this product. By the designation of *Goor*, *Guru*, or *Kolla*, they were brought to the markets of Mourzuk for sale, from Dagumba, Ashanti, and other circumjacent regions, in parcels, enwrapped by a peculiar kind of leaf, which, by being occasionally moistened by water, retained their freshness, and thus maintained their value, for months. This mode of preservation is likewise

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* "Ma no v'ha frutto di niuna sorte; eccetto alcuni frutti che producono alberi molti grandi, i quali si assomighano, alle castagne ma tengouo alquanto dell' amaro. Questi arbori si discontano dal fiume verso la terra ferma; il frutto, ch'io dico, è chiamato nella lor lingua Goro."—Della Descrittione dell Africa, etc., per Giovan Africano: Viaggi da' Ramusio, part 1, page 9. edit. Venice, 1613.

pursued, by the caravans returning from the coastal districts, to Kano, and other marts of Central Africa, the leaf of a species of *Phrynium*, or other succulent plant, being resorted to for a similar purpose. For it is well known that if they are permitted to become dry and shrivelled, they lose, not only their mercantile demand, but a considerable portion of their bitterness. In this condition they are termed in Tripoli, *Kowda*, and are held to be of inferior estimation. According to Lyons, the seeds in their fresh state sell in Fezzan, at the rate of four per dollar, a price that virtually precludes their enjoyment by the poorer classes of people. These so valued luxuries are offered to visitors as a substitute for coffee, being handed round on salvers ; hence the frequent application of the title, the coffee of the blacks, or of Soudan, bestowed on them. If some of the native reports be trusted, when in former years a great scarcity of this fruit prevailed, owing to a long-continued dearth, so difficult was it to procure a few of the nuts, that a slave was frequently given in exchange for one.

Denham, Clapperton, and the more recent travellers Richardson, Barth, etc., who have traversed many extensive kingdoms of Central Africa, likewise furnish incidental notices of this popular tonic, and stomachic. The last-named traveller has, however, entered more fully into the details of the subject, stating that they were considered the greatest luxuries that negro-land, or Soudan, could afford, and as articles of trade, were daily increasing in importance, as might be gleaned from the fact, that they comprehended, with gold dust and salt, the three staple commodities, that supplied and governed the markets of Timbuktu. A few imperfect outlines respecting their botanical origin, renders it necessary that I should revert to his statements in a future portion of this paper.

My knowledge of the tonic and astringent properties of the Kola-seeds, commences so far back as 1850, when in garrison at Fort Christiansburg, on the Gold Coast, West Africa, then but recently transferred to the British crown. With other diseases endemic to the settlement, a particular form of diarrhœa often prevailed among the European population, caused more by local relaxation of the mucous membranes and other visceral structures, than from constitutional debility. For its cure, the white inhabitants were in the habit of administering a decoction of the fresh seeds, and with apparent benefit. Experiencing a similar form of attack, I was relieved by resorting to the same remedy.

This affection having supervened whilst recently residing in Jamaica, I followed the same system of treatment ; but, much to my surprise, on taking the medicine late, two evenings in succession, found that I was deprived of sleep, during the remainder of the night. Uncertain whether this insomnia proceeded from some temporary constitutional idiosyncrasy, or an inherent peculiarity belonging to the fresh seeds, I intermitted taking the decoction for a few days, and with the intermission, the natural rest returned ; on again continuing the medicine in the evening, I invariably found its administration attended, more or less, with loss of sleep. I was then reminded how practically verified (after the lapse of two centuries,) were the quaint remarks of Dapper, one of our enterprising African voyagers, who announced that the seeds, "as experience teacheth, eaten in the evening hindreth sleep."* This singular and well-developed phenomenon, the result of a powerful stimulant on the brain and nervous system, produced by some elementary principle analogous to caffeine, or theine, led me to infer from physiological induction, that an analysis of the seeds would readily determine this point in the affirmative. Following the process commonly in vogue for obtaining theine, from other plants, viz. by mixing with a strong decoction of the fresh nuts, acetate of lead to precipitate the astringent principle, and then

* Ogilvy's Africa, p. 494.

transmitting sufficient sulphuretted hydrogen, to remove the excess of lead, after the gradual evaporation of the liquid, numerous long needle-like crystals, became deposited in the glass. These, on comparison with a large sample of this alkaloid in Kingston, proved to be identical. As, however, it was deemed desirable to have a more elaborate chemical examination of the ultimate constituents of these seeds, and also to determine fully the character of the theine previously procured, a quantity of the broken dried nuts, were placed in the hands of a practical chemist, Dr. Attfield, at the same time intimating to him, that I had already obtained theine as one of the chief elements; and the result of his labours hitherto, has been to establish the validity of my discovery, and the correctness of the estimate I had formed respecting the true nature of this alkaloid.

In the preceding introductory statements, I have endeavoured, so far as consists with the importance of the subject, to condense within restricted limits, various characteristic details of interest, such as might tend to elucidate the origin of that constitutional craving, which induced the negro tribes to select this in preference to other vegetable products for dietetic purposes. A concise historical summary of their aboriginal appliances is at the same time supplied, in allusion to those primitive usages existing long anterior to the visits of the "children of God"* to the shores of Western Africa.

The discovery of Theine as a constituent of the seeds, affords a ready physiological solution of several of those otherwise obscure effects, manifested by their therapeutic influence on the human constitution.

One remarkable feature worthy of mention, is the marked avidity displayed in modern days, by the negro inhabitants of Sierra Leone, and Portuguese colonies, for the nuts in preference to the beverages of tea and coffee, although each contains the same elementary alkaloid. I have occasionally observed that even the coffee tree, more or less under culture in their farms or gardens, is neglected, and on the whole they are indifferent to the stimulant properties of its fruit, so long as the Kola-nuts are attainable; nay, they indulge in the luxury of chewing them, even when gathering the ripe purple-coloured berries of the former, for sale, or domestic use. Nevertheless, the semi-civilized negro enjoys his cup of tea and coffee, with the same *goût* as a European.

Wherever the slave trade prevailed, the *Cola acuminata* appears sooner or later, to have been introduced as a necessary sequence, to the importation of slaves to their new homes; and in countries, where they became located in large numbers, it was studiously imported, and cultivated for their advantage and benefit. Hence the introduction of the tree into the Mauritius, several of the West Indian Islands, Brazil, Mexico, and other extensive regions on the continent of America.

In Jamaica, the young plants were brought over and naturalized from the Gold Coast between the early epochs of 1630–40, by a Guinea trader, under the local appellation of *Biche*, or *Bissai*, a name still retained throughout the island. Its importation has been ascribed to the urgent request of an agent of large sugar estates, exclusively worked by the Coromantyn, or Gold Coast negroes. Similar to the grains of Paradise (*Amomum Malegueta*, Rosc.), it was specially intended to act, either as a medicinal prophylactic agent, or as an ordinary article of food, to avert, as far as practicable, those attacks of constitutional despondency, to which this class of negroes were peculiarly liable. By thus allowing them the means of participating in those favourite condiments in general use in Africa, that predisposition to epidemic outbreaks of suicidal mania, (an inevitable propensity for which ran like infection through several contiguous

* *i.e.* Europeans,—a term by which they were designated when first seen by the negroes, and applied even at the present day in some of the regions of tropical West Africa.

estates,) became gradually diminished, and ultimately checked, after narrowly entailing an almost total depopulation in not a few of them.

(*To be continued.*)

Professor BENTLEY, who (in the absence of Dr. Daniell, from illness) read the paper, said that it was most remarkable that the properties of Kola-nuts, which the author had detailed to them in his present communication, should have hitherto been so little alluded to in civilized countries. More attention would doubtless now be directed to their uses, and the experience of those best able to judge of their merits would soon ascertain their real value. Whatever might be the result of the trial of the properties of these seeds, there could be no difference of opinion as to the importance of the discovery of *theine* as one of their constituents. This was most interesting, as hitherto no such alkaloid had been found in any plant of the order from which Kola-nuts were derived, or even from any one very closely allied to it. Theine, it might now be observed, had been obtained from no less than five genera of plants belonging to as many different natural orders. Thus from Kola-nuts the produce of species of Cola of the Order *Sterculiaceæ*, from *Thea* (*Ternstrœmiaceæ*), from *Coffea arabica* (*Cinchonaceæ*), from *Ilex Paraguayensis* (*Aquifoliaceæ*), and from *Paullinia sorbilis* (*Sapindaceæ*); moreover, an analogous alkaloid (*theobromine*) was obtained from *Theobroma Cacao* (*Byttneriaceæ*). It was most remarkable that all the most important unfermented beverages in use in different parts of the globe should be prepared from substances containing the same or a closely allied alkaloid. Much credit was due to Dr. Daniell for the discovery of this new source of theine.

Mr. DANIEL HANBURY regarded the experiment tried by the author, to ascertain whether the Kola-nuts had the property commonly attributed to them of sweetening putrid water, very unsatisfactory. He saw no reason at present to doubt the correctness of the opinion generally received as to their use for this purpose.

ON THE FOOD-VALUE OF THE KOLA-NUT—A NEW SOURCE OF THEINE.

BY JOHN ATTFIELD, PH.D., F.C.S.,

DIRECTOR OF THE LABORATORIES OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

A short time since, Dr. Daniell placed in my hands a few ounces of hard dry fragments of Kola-nuts, stating that in the fresh state they were largely used as an article of food and medicine by the natives of Western Central Africa; that he had himself once partaken of the fresh nut, the effect being that he was kept awake for many hours; that he therefore inferred that they must contain a principle similar to that which exists in tea, coffee, etc., namely, Theine; and that he had in fact, by a rough chemical process, succeeded in obtaining crystals resembling Theine in appearance. As a medicine, the *fresh* nut, Dr. Daniell said, was esteemed of great value in diarrhœa and affections of the liver; and that indeed, for all purposes, it was in the fresh state that the nut was generally employed, portions being chewed, the juice swallowed, and the solid part ejected from the mouth. If the nuts were allowed to become dry, they were considered to have depreciated in value, and were then only chewed by the lower classes of the natives. Altogether, Dr. Daniell considered that the nut possessed an amount of interest sufficient to demand analysis. I quite agreed with him, and the following is the result of the examination.

Search was first made for Theine. Colouring matter, mucilage, etc., having been precipitated from a decoction of the nut by solution of basic acetate of lead, and excess of lead removed from the filtered liquid by sulphide of hydrogen, the clear supernatant fluid was evaporated to dryness over a bath, the residue digested in hot alcohol, and the latter evaporated to a small bulk. This on cooling solidified to a pasty mass of crystals, which were examined and found to have all the characters of Theine. They were identical in crystalline form with some Theine prepared from tea, both when seen under the microscope with and without polarized light, and in their general silky character when viewed by the naked eye; they yielded the beautiful red colouring-matter known as caffeo-murexid when treated with nascent oxygen, and gave gaseous methylamine when treated with caustic potash. These reactions and the effect of the nuts on Dr. Daniell, together with the well-known peculiar curved or fan-like character of the crystalline masses as usually formed, and their long, acicular form when deposited from a highly dilute and perfectly pure alcoholic solution, as in preparing a specimen for the microscope, will probably be considered sufficient to establish the identity of the crystals with Theine. I shall, however, subject the substance to ultimate analysis so soon as the possession of more nuts enables me to prepare a sufficient amount. A quantitative determination showed that the proportion of Theine present in dried Kola-nut is 2 per cent. Coffee contains from ·5 to 2·0, and tea from ·5 to 3·5 parts in 100.

The dried nuts were next examined for any basic, neutral, or acid principle to which the properties other than those of causing sleeplessness might be due, but no such principle was found. This result might have been expected, from the statement that the fresh nuts lose so much of their properties in drying as to greatly diminish in value. Moreover the fresh nuts, Dr. Daniell tells me, have a bitter taste, while the dried fragments I examined had no trace of bitterness. Apparently therefore it is to the bitter principle that a portion of the activity of the nut must be ascribed. I shall endeavour to throw more light on this point when I succeed in obtaining specimens that have been preserved in a moist condition.

The presence of Theine, then, at once points to the analogy of Kola-nut, or at least of dried Kola-nut, with coffee, tea, and two other similar but less common substances—Paraguay Tea and Guarana. Infusions of one or other of these vegetable products are used as beverages probably by three-fourths of the human race, and each contains the same active principle—Theine. To these must now be added the Kola-nut. Thus does chemistry reveal the true reason why the unerring instinct of man, even in his savage state, has led him to select from the many thousands of plants presented to him in nature, just four or five with which to concoct a beverage that would seem to be a necessary rather than a luxury of life. And what makes the matter more remarkable is that these plants are not botanically allied. What Theine really does do for the system is not yet very well made out. Liebig thinks that it may aid in the formation of that substance, a normal quantity of which is so necessary, and an abnormal so unpleasant—namely, bile. Most chemists agree that it arrests that rapid consumption of tissue and consequent feeling of fatigue which we all experience when we work hard with mind or body. Whatever may be its exact office, its discovery in Kola must greatly enhance its physiological interest, showing, as it does, that the instinctive desire for it in one form or other by Europeans, Americans, and Asiatics, is shared by the natives of Africa.

The other constituents of dried Kola-nut also indicate that it has the character of coffee, though differing from that article of diet in some important respects. Thus, on examining some finely-powdered coffee under the microscope, but few or no granules of starch are to be seen; while the powder of Kola is, apparently, one-half starch, the granules forming the prominent object enclosed by the brownish-yellow coloured cell-walls of the tissue. A rough quantitative determination, accomplished by kneading the thoroughly powdered nut in a fine calico bag under a stream of water, a process by which the starch is washed out into a receiving vessel, and the cell-wall remains in the bag, showed that starch, dried at 212° F., is present to the extent of 42·5 per cent., and cell-wall and colouring matter to the amount of 20 per cent. Kola-starch granules are of about the same size as those of wheat, namely, from one thousandth to one ten-thousandth of an inch in diameter, but are readily distinguished by their action on polarized rays of light, which they so affect as to be apparently traversed by a black or white cross, whose four arms meet at the hilum in the centre of the granule, the beauty of the effect being of course enhanced when a plate of selenite is placed beneath the object in the path of the ray. The colouring matter of the cell-wall of the nut is soluble in alkaline solutions, yielding reddish-yellow solutions. Then, again, Kola resembles coffee in containing a small quantity of a fragrant aromatic volatile oil, having a burning, persistent, penetrating taste. In the case of Kola the odour closely resembles that of myrrh. Probably, as in coffee and tea, some of the activity of Kola is due to this volatile oil. Kola also contains a fixed fatty matter, the fat and oil being dissolved out of the powdered nut by ether to the extent of $1\frac{1}{2}$ per cent. In coffee there is 10 to 12 per cent. of fat, while tea has none. There is 1·56 per cent. of nitrogen in dried Kola-nut. Subtracting from this number ·56, which is the amount that belongs to the Theine, there is left 1 per cent., which appears to exist in the form of 6·33 per per cent. of an albumenoid substance resembling legumin, one of the so-called flesh-forming materials. Kola can, however, be but of little value as a flesh-forming article of food, because apparently the juice only of the nut is swallowed: the more solid part, which would of course contain nearly the whole of this nitrogenous matter, being rejected. Moreover, unless the natives consume very much more of Kola than we do of coffee, the total amount of flesh-forming material they would eat at a meal, even if they swallowed the whole of the nut, would be too small to be worth taking into consideration as a constituent of food. Coffee contains 13 per cent. of this nitrogenous matter, and tea about 22, but in our methods of making beverages from these two substances, scarcely any of it is swallowed, it remaining as valueless along with the spent leaves and fragments. The ash obtained on burning Kola is 3·2 per cent., about half the amount that coffee or tea yields. It resembles the ash of coffee and tea in being composed of chlorides, sulphates, and phosphates of potash, lime, and magnesia. The greater part of the phosphoric acid is in the soluble condition, probably combined with potash or ammonia, and would of course be swallowed with the juice on chewing the nut. Gum, sugar, and other organic matters, the nature of which could not be determined, are present to the extent of 10·67 per cent., a proportion similar to that in coffee and tea. Finally, the common astringent principle tannin, which occurs in coffee to the amount of 5 per cent. and in tea to 15 per cent., and which gives to tea and coffee beverages their pleasant rough taste, is entirely wanting in Kola.

The following is a tabular form of the composition of dry Kola-nuts:—

	In 100 parts.
Water	13·65
Cell-wall and colouring matter	20·00
Starch	42·50
Volatile Oil, Fixed Fat	1·52
Albumenoid substance	6·33
Gum, Sugar, Other organic matter	10·67
Ash	3·20
Theine	2·13

Kola then, in the dry state, somewhat resembles coffee, but differs in not containing tannin, in possessing but little fatty matter, and in the presence of much starch. Indeed, so far as its analysis indicates, if the fresh nut did not possess peculiar virtues, which apparently are lost on drying, it might be advantageously substituted by coffee. For when made up into a beverage it is thick and mucilaginous like cacao, but is tasteless, inodorous, flavourless; nor is it improved in these respects by roasting.

An examination of the fresh nut would probably add greatly to the interest of this already interesting material.

Some curious facts concerning the commercial, social, and even religious and political relations of Kola-nuts will be found in the accompanying paper of Dr. Daniell, and in a *résumé* of several papers in the 'Journal de Pharmacie' for 1832, p. 702.

Mr. Hanbury thought it would be worth while searching for Theine in Kat, the leaves and twigs of *Catha edulis*, used in forming a beverage similar to tea on the opposite coast of Africa.*

ON THE BOTANICAL ORIGIN OF SAVANILLA RHATANY.

BY DANIEL HANBURY, F.L.S.

It is a fact well known to druggists that the Rhatany Root which formerly found its way into European commerce from Peru, has to a great extent been superseded by another and very excellent form of the drug exported from New Granada and commonly known in the market as *Savanilla Rhatany*. But from what plant this latter drug is derived or in what part of the vast territory of New Granada it is produced, are points upon which I believe that no definite information has yet been published.

Having endeavoured during some years past to elucidate these questions but without much success, I gladly took occasion of the recent mission to New Granada of Mr. John Weir, collector to the Royal Horticultural Society, to suggest that enquiries should be made at Santa Marta regarding *Savanilla Rhatany*, and that Mr. Weir should, if possible, visit the locality where the root is collected. The Royal Horticultural Society having accorded permission to Mr. Weir to devote some attention to this object, he soon succeeded in ascertaining that the rhatany in question is obtained from the vicinity of Jiron, a small town lying to the west of Pamplona and about midway between it and the river Magdalena. To this place, Mr. Weir directed his course, arriving there in the latter part of January 1864, when he thus wrote:

"*Jan.* 31*st*. Enquiring to-day where the Rhatany plant was to be found, Mr. L. informs me that in various places among the naked hills and savannahs around, the plant grows in plenty, but none nearer than a short day's journey from Bucaramanga. He told me, also, that he used to export large quantities of the drug, but that he had lost $2000 by the last lot he sent away, and had not sent any for the last twelve months. I saw, however, a quantity of the root in another house, packed in bags ready to be sent away.

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"*Feb.* 1*st*. Started this morning for the valley of Jiron. A few leagues above the village of that name the Rhatany was said to be common, much

* Since the meeting a specimen of Kat has been examined. It does not contain Theine.—[J. A.]

of the root being there dug for export. The road lay up the bottom of the valley, following the course of the stream the whole way. Two leagues above the village the plant begins to be frequent, and a league further on there are large tracts covered with it. The soil it grows in is arid, hard, and gravelly in the extreme, so much so that in taking up the root the instrument used is a strong iron crowbar, a little flattened at the lower end; from the same cause the roots are generally broken into small pieces in the process, it being rather brittle when fresh. The general height of the plant is about four feet; but in some places it seems to grow stronger than in others, and I saw considerable patches of the shrub quite six feet in height.

"I gathered many specimens of the plant in flower and fruit, and also a small specimen of the root attached to the stem and branches."*

The specimens here alluded to, consist of the pressed and dried plant bearing flowers and fruits, and stems with roots attached, the last being in every respect identical with the Savanilla Rhatany of commerce. A slight examination sufficed to prove the plant a species of *Krameria*, and the next point of interest was the determination of the species. Turning to the newly published *Prodromus Floræ Novo-Granatensis* of MM. Triana and Planchon, one finds three species of *Krameria* there enumerated, namely *Kr. Ixina* L., *Kr. grandiflora* St. Hil. and *Kr. spartioides* Kl. to the first of which Mr. Weir's plant proved to be most nearly related. Unfortunately no specimen of *Kr. Ixina* now exists in the herbarium of Linnæus, but in that of the British Museum there are two, representing that form of the plant which has been figured by Hayne.† From this type, the New Granada plant differs in having leaves which in the young and vigorous shoots have a spathulate rather than lanceolate outline, besides which they are somewhat more hirsute. In flowering shoots of less luxuriant growth, these differences are far less marked, and the plant in this state appears to vary but little from the true *Kr. Ixina*. The flowers and fruits do not present, so far as I have observed, any marked differences.

Upon showing Mr. Weir's plant to my friend Dr. Triana, he at once identified it as the *Kr. Ixina* of the *Prodromus Floræ Novo-Granatensis*, distinguished in his MS. notes as var. β. *granatensis*. Considering the present state of our knowledge of the species of *Krameria*, Dr. Triana's determination of this plant as a variety of *Kr. Ixina* appears to me highly judicious, and far safer than the introduction of a new specific name, which the receipt of further specimens would probably show to be untenable. I therefore accept *Krameria Ixina* L. var. β. *granatensis* of Triana as the plant, the dried roots of which constitute the drug known as *Savanilla Rhatany*.

This form of *Kr. Ixina* has an extensive geographical range, for besides occurring in the locality already mentioned, it exists in Brazil, where it was collected in the island of Itamaraca near Pernambuco by Gardner, who described it as "a shrub about 3 feet high with long spreading branches." Another specimen from the same botanist in the Hookerian Herbarium, is labelled "common on dry hills in the Sertão of the province of Ceará."‡

* *Proceedings of the Royal Horticultural Society*, Nov. and Dec. 1864, p. 181.

† *Arzney Gewächse*, viii. 13.

‡ For further information on the hitherto-described species of *Krameria*, and the various kinds of Rhatany-root found in commerce, the reader may consult a valuable paper by Professor Otto Berg, in the 'Botanische Zeitung' for October and November, 1856.

PHARMACEUTICAL SOCIETY, EDINBURGH.

The fourth meeting of the present session was held in St. George's Hall on the evening of Tuesday, 14th current, at 9 o'clock; Mr. Kemp, President, in the chair.

After a few preliminary remarks by the Chairman, the following communications were made:—

1. Notes on a New Species of Gall from China, with references to other unusual Commercial Galls, by Professor Archer, of the Industrial Museum.

Since the greatly increased demand for gallic acid which has been caused by the requirements of photographic chemistry, much interest has been felt in obtaining galls from various parts of the world from which to procure that acid. One of the first new products of this class was the Chinese gall, described by Dr. Pereira in the 'Pharmaceutical Journal,' vol. iv. p. 384, 1844, under the name of Woo-pei-tsze. These have now become regular articles of commerce, and so also has a similar one obtained in Japan, rather smaller but apparently produced on the same tree, or a closely allied species. Mr. Daniel Hanbury, who has carefully examined the Chinese galls, is of opinion that they are produced on *Rhus semi-alata*, and Mr. Doubleday, the entomologist, has shown that they are caused by an aphis and not by a cynips, as in the case of most other galls with which we are acquainted.

Next came a small gall from India, called by its Indian name Mahee, this is yielded by two species of Tamarisk (*Tamarix indica* and *T. furas*); they are very rich in gallic acid, but are not procurable in very large quantities. The shrub, however, grows in Algiers, and there it appears to yield the galls more abundantly, as very considerable quantities are exported to France under their Moorish name Takaout. There is a curious gall, shaped somewhat like an ox horn, and about two inches or two and half inches in length, which has a commercial value in India but has not yet found its way into our markets, it is called Kakarasinghee or Kakrasingee, and is produced on *Rhus Kakrasinghee* (Royle); they are to a small extent used by the Indian tanners, and have also a place in the Materia Medica of India, possibly ere long they may become articles of import into this country.

The gall most extensively used in Southern Germany is the curious Knoppern, produced by the puncture of a species of *Cynips* on an oak-tree, *Quercus Cerris*. These have been imported occasionally, but are very inferior in quality to the common Turkish galls. In Italy, France, Turkey, and India, the galls formed on several species of *Pistachio*, as *Pistacia vera*, *P. lentiscus*, etc. are used, and those from *P. lentiscus* are largely used for tanning in Turkey and Italy. Their value is not known in this country.

The latest novelty is a very curious gall which I have just received as an import from Shanghae; it bears strong resemblances to the Chinese and Japanese galls, but has not their peculiar branched appearance; on the contrary, it has mostly the form of a radish-pod, and although some are slightly tomentose, as in the case of the other two, yet most of them are smooth; here and there we find amongst them some which have a tendency to the branched form, indeed these galls seem to be intermediate in their general characteristics between the Kakarasinghee and the Woo-pei-tsze. They were lately imported into Liverpool, and doubtless will soon become common.

2. Note on a New Article of Commerce, called Cape Saffron, by Professor Archer.

This remarkable product, which strikingly resembles saffron in all but its colour, is the dried flower of a very small plant extremely common in some parts of the Cape of Good Hope, taking there the place of our common Toadflax, *Linaria vulgaris*, and belonging to the same Natural Order, *Scrophulariaceæ*. It yields a colour like that of saffron, and, what is very remarkable, it yields it as readily when mixed even with cold water, moreover its odour is that of good saffron, and equally strong; two importations have taken place, the first about five years since, which was only a small sample, the latter about 70 lb. weight; the former shared the fate of thousands of valuable products, it was buried in a drug-broker's drawer, the latter is in the hands of an intelligent merchant, Mr. David Bain, 50, Stanhope Street, Hampstead Road, London, who is fully alive to the value of bringing forward the economic products of the Cape. Dr. Pappé since called attention to the uses of this plant, and the following quotation is from his 'Floræ Capensis Medicæ Prodromus:'—

"This bush deserves notice as a drug, and in all probability will, ere long, become an article of colonial export. It grows abundantly in some parts of the eastern districts, whence it has found its way into the dispensary. The flowers, which are called *Geele bloemetjee*, closely resemble saffron in taste and smell; they possess similar medical properties, and as an antispasmodic anodyne and stimulant ought to rank with the *Crocus sativus*. Here they have as yet been only used with success in the convulsions of children, but they deserve a more general trial. On account of the fine orange colour which they impart, they are in daily request among the Mahomedans, who use them for the purpose of dyeing their handkerchiefs. This drug has been observed to be sometimes adulterated by the admixture of other plants of the same genus which are less efficacious."

3. Note on a New Product, called Cubebs, from Southern Africa, by Professor Archer.

This material has been sent from Cape Coast Castle, under the name of African cubebs. It has, however, no relationship to *Cubeba officinalis*, or any other pepper, but belongs to the Natural Order *Xanthoxylaceæ*, which is celebrated for the agreeable pungency of the fruits of many of its species, especially in the genera *Toddalia* and *Vepris*, to one of which it undoubtedly belongs. I believe it is the fruit of *V. lanceolata* (A. Jussieu), the *Toddalia lanceolata* (Lamk.); this plant is pretty widely diffused, for it is found in the island of Mauritius, and is also common in the woody districts of various parts of the Cape of Good Hope. There is some slight resemblance to cubebs in this drug, but the slightest examination shows that it has no affinity with the peppers; its dry dehiscent capsule, with the hard bluish-black shining kidney-shaped seeds, and the membranous remains of the abortive cells, are distinctive characters which are quite sufficient to prevent any mistake. The properties are simply aromatic and stimulant, without any approach to the special properties which cubebs exercise upon the urinary organs.

These notes were illustrated by a variety of specimens, which were viewed with much interest by the meeting. A portion of the Cape saffron having been immersed in cold water parted very readily with its colouring-matter, and there can be little doubt that, when better known, it will take the place of the ordinary hay-saffron wherever that article is used. From the price being much lower that of the best saffron, it cannot fail to become an article of commerce in this country.—A vote of thanks, proposed by Mr. Young, to Professor Archer for his communications, was carried unanimously.

Mr. D. R. Brown, as convener of the committee formerly appointed to consider the question of poisoning and the means of prevention, read the following report:—

"Your committee beg to say that they found the subject they were called to decide upon of far more importance and much more difficult than to allow an offhand report to pass from them as their deliberate conclusions. The questions raised were numerous; and their proper answers are important, alike from the bearing they have upon the character of the Pharmaceutical Chemist, and upon the welfare of those who place confidence in his professional skill. It became your committee, therefore, to see to it as carefully as they could, that they neither mistook the questions nor the answers.

"Towards the proper fulfilment of the duty laid upon them, it appeared to your committee requisite to classify, in some way, cases of poisoning. So far as your committee can see, they all rank themselves under one or other of two heads, either poisoning by design or by carelessness; for that called 'accident' is held by your committee to have somewhere and always about it more or less of carelessness.

"Under the first head, 'Poisoning by Design,' there is the murderer and the suicide. Your committee presume that such cases were not included in your remit, and therefore enter no further on them than to say, they believe that now, as in time past, Pharmaceutical Chemists, and Chemists and Druggists, exercise a most careful and most judicious caution in the sale of all poisonous substances.

It is to cases falling under the second head, 'Poisoning by Carelessness' or 'Accident' so called, your committee have specially directed their attention. Here your committee find, comprehending them all,—1st. A mistake as to the substance; 2nd. A mistake as to the quantity; 3. A mistake as to both substance and quantity; 4th. A mistake in sending out the preparations, *i.e.* to the wrong person.

"Although perhaps not needful, yet, as a means whereby the Society may see the grounds upon which your committee have come to conclusions, they think it right to call the serious attention of the members to what all must know; namely, that the source of the errors which they are called upon to prevent lies altogether in the mind of the wrongdoer; and that, whatever be the means employed for the prevention of the errors, they must, to be effectual, be applied to the mind, and so applied as to call intelligent attention to the work in hand, or they will be useless.

"Again, the means used for their prevention cannot be one and the same for all the possible errors: that which may perhaps tell the Pharmaceutical Chemist he has the wrong substance in his hand will never tell him nor the prescriber that the posology of the prescription is at fault, either in fact or imagination. Neither are the means which warn of danger merely, enough: aconitine, strychnia, atropine, morphia, arsenious acid, and very many more, are *all* dangerous, and need discrimination each from all the others. The warning to be given is not always that this is a dangerous material and that an innocent one, for it very often should be,—'*that* dangerous substance is the proper one, *this* is not.'

"To procure perfect safety, the questions which the Pharmaceutical Chemist must put and find a true answer to, are these:—Is this the proper substance? Is this the proper quantity? Is the prescription rightly read and understood, and is the posology correct? Is it properly prepared and labelled? correctly addressed and duly delivered to the person for whom it is intended? On all these points there is a liability to err; and against such misadventures your committee have to report, that they are not aware of any mechanical means whereby the whole necessities of the case are, or might be met.

"After a careful examination of the questions involved, your committee are of opinion, —First, that none of the mechanical methods hitherto proposed for the prevention of accidental poisoning, can do more than meet the evil partially, and for a time. Second, that no mechanical means for the prevention of poisoning can, or ought to supersede a thoroughly educated Pharmaceutical Chemist, well instructed in all that relates to the nature and properties of the substances with which he is called upon to deal, and clearly understanding the responsibilities which lie upon his handiwork. Machinery to remind the Pharmaceutical Chemist that he is engaged with dangerous substances, and tell him when and where he is wrong, would, if perfect, render him useless, and might, with equal propriety, be applied to the lawyer, the physician, or even the divine. Your committee are therefore unanimously of opinion, that the best security against accidental poisoning which can be given to the public, rests in the intelligence and care of those engaged in the practice of Pharmacy; without which, no arrangement or mechanical appliances will be of the least use.

"In conclusion: your committee have had under their consideration various means for preventing mistakes on the part of those who have occasion to use, or administer medicines, and particularly the propriety of putting dangerous substances into bottles of unusual shape. Your committee are of opinion that such a practice might be of much use, provided the same shape of bottle were universally adopted and rigidly adhered to; but that otherwise it would fail to answer the end desired."

The reading of this report lead to a very lengthened discussion, in which Professor Archer, the President, Messrs. Mackay, Nichol, Stephenson, and D. R. Brown took part. The general feeling was to disapprove of any capsule or other means for the fixing, covering, or fastening the stoppers of dispensing bottles. Most of those who spoke, while admitting that the system of peculiar-shaped bottles for poisonous preparations was a good one, yet thought it inadvisable in the meantime to introduce these generally, until dispensing chemists, as a body, had agreed to adopt and adhere, to the practice of dispensing certain preparations in one particular kind of bottle, and thus ensure uniformity in all respectable establishments. In no way could such an end be obtained but by legislative enactment; and as there were certain matters in connection with the entire regulation of the important question of poisons under consideration, it was hoped that, ere long, such regulations would be proposed and enforced which, while they would tend to give increased security to the public, would also prove a satisfaction to the Pharmaceutical Chemist and dispenser of medicines. The approval of the report having been put by the Chairman to the meeting, it was carried unanimously; and, after a vote of thanks to the committee, the meeting adjourned.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

The Liverpool Chemists' Association, in pursuance of its objects, and according to its usual custom of affording to its members and their friends a treat of combined intellectual and social enjoyment, held a *conversazione* at the Royal Institution, Colquett Street, on Thursday evening, February 2; and judging by the large and fashionable attendance, it was one of the most successful that has hitherto taken place.

The entire suite of rooms of the above spacious building was thrown open on the occasion, together with the Gallery of Art and the Museums of Natural History, Geology, Applied Science, and the very interesting one belonging to the Chemists' Association. Several objects of interest, including illustrations of recent improvements in photography, and in several arts and manufactures, mechanical devices, etc., were, by the zealous efforts of the Council of the Association, placed in several of the museums for the inspection of the company; and some vases of rare ferns and other plants disposed in the halls and staircases, gave a freshness to the display that added considerably to the effect.

At half-past six the doors of the Institution were thrown open, and in a very short time, despite the trying state of the weather, over three hundred ladies and gentlemen arrived. They were soon promenading through the various galleries and museums, inspecting the novelties, which, in addition to the very large and well-arranged collections of the Institution, were brought there for the occasion. The large series of photographs, by J. B. Cros, Esq., the automatic female Blondin, by Messrs. Freisch and Co., and various beautiful stereoscopes, by Messrs. Chadburn and Abraham and Co., attracted the attention of one section of the company; the models of ships, of a floating graving-dock, and of machinery illustrative of improvements in connection with shipping interests—the great characteristic interest of Liverpool—by Captain Walker, that of another section; whilst the microscopic exhibitions superintended by Messrs. J. Abraham, T. F. Abraham, T. J. Moore, and W. J. Baker, were closely attended by others, and many were not unwilling to dwell upon the models of the antediluvian Saurians lent by the curator of the Derby Museum, T. J. Moore, Esq.

At half-past seven the company assembled in the large theatre of the Institution, when the President of the Association, A. Redford, Esq., took the chair, and addressed a few words to the meeting, expressive of his welcome to them, and of congratulations on behalf of the Association for the large and brilliant assemblage before him. He trusted that all would find the evening's proceedings pleasing and satisfactory, both in repect to the novelties provided and to the instructive addresses that would be delivered to them; so that they might carry with them the conviction that the present entertainment would be up to the standard of excellence which was characteristic of the *conversazioni* of the Chemists' Association.

After referring to the special subjects of addresses to be delivered during the evening, he begged to call upon Dr. Edwards to favour the audience with that standing to his name on the programme, namely, "On the new oxyhydrogen lantern, with photographic projections, and biographical notices of eminent scientific men."

Dr. Edwards proceeded to describe the lantern, which was lately patented by Mr. Chadburn, of Liverpool, and was known as "Chadburn's Patent Opaque Oxyhydrogen Lantern." In the course of his address he stated that the new lantern differed from those heretofore employed for the projection of opaque objects, chiefly in having but one reflector, by which the rays from the illuminating medium were thrown back upon a large condensing lens, which concentrated and discharged them at an angle of 45° upon the object to be shown. Opposite the object is fixed a whole-plate achromatic photographic lens, by which a very clear and well-defined image is projected on the screen. The lantern is capable of highly illuminating a disk of about four inches diameter, and all objects not exceeding this area are clearly exhibited by it,—such, for instance, as fossils, corals, fruit, feathers, etc.; photographs on paper, as ordinary *cartes-de-visite*, illustrations in books, diagrams, engravings, etc.,—a range of subjects which sufficiently indicates the advantages of this elegant apparatus.

At this stage, Mr. Chadburn took the management of the lantern, and projected upon the screen, with remarkable definiteness, Maule and Polyblank's photographs of Lord Rosse, Lord Brougham, Professors Faraday, Graham, Brande, Miller, Taylor, Redwood, Bentley, Owen, Carpenter, etc.; also of some eminent pharmaceutists, among which we noticed those of Messrs. Morson, Deane, and the late Jacob Bell. Dr. Edwards gave a succinct biographical sketch of many of these gentlemen, noticing their chief scientific labours as their portraits appeared on the screen. Finally, some photographs of the moon in its different phases, and the movements of a chronometer watch in action, were beautifully depicted on the screen; and the audience frequently, during the preceding illustrations, manifested their gratification by hearty applause. An interval for promenade and refreshments was announced, but the zest for creature comforts, which were supplied throughout the evening on a liberal scale, proved to be very subjective with a great many to the desire for intellectual observations and study, for in this interval large numbers beset the microscopic exhibitors on the geological gallery, to obtain a sight of the various objects shown under their very powerful binocular instruments.

The objects which appeared to attract most favour here were the diatoms, polycystins, and the ova of the salmon in various stages of development. Dr. Edwards, during this interval, exhibited some brilliant experiments with Geissler's vacuum tubes, and several fluorescent liquids and glasses; he likewise showed the effect of vibration by the production of figures on a horizontal plate covered with sand, and also by delineating the figures of a common chord, illustrating the laws of sound as investigated by M. Lissajou and others.

At half-past eight the gong once more summoned the company to the theatre. The President introduced Wm. Crookes, Esq., F.R.S., of London, and expressed his confidence that the high anticipation which he, in common with the audience, had entertained of the pleasure of hearing Mr. Crookes, would be fully gratified, and concluded by saying that Mr. Crookes well merited the dignity of being ranked with original discoverers, by his successful labours in an unexplored plain, and by which he had the honour of enriching chemistry with the discovery and development of a new elementary body—thallium. He had great pleasure in calling upon Mr. Crookes to favour them with his lecture "On the Recent Application of intense Chemical Action to the Production of Heat and Light." Mr. Crookes, who on coming forward was warmly applauded, proceeded with the subject of his lecture, premising that whenever chemical action took place, it was always governed by one particular kind of force—chemical affinity; and although in the manifestation of this force with certain classes of bodies, varied and surprising effects presented themselves, still such effects could only be regarded as degrees of the intensity of chemical affinity. In the oxidation of iron in moist air, the decay of woody fibre, the change of saccharine fluids in contact with a fermenting agent, and of the effete matter of the blood in the lungs of living animals, as true a combustion of certain matters took place as was evidenced in the burning of a coal fire or of the gas in the lamp before him. In those, however, the action was slow and diffused, while in these it was rapid and compressed; hence the apparent difference in the results. Still, by judiciously conserving the effect where the action appeared so feeble as to be almost inappreciable to casual observation, as in the galvanic battery, great intensity could be acquired and manifested. He then gave illustrations of powerful and rapid chemical action by means of sulphuric acid and water, the burning of potassium in water, the ignition of chlorate of potassa and sugar by sulphuric acid, the burning of gun cotton, magnesium, etc., and compared such bodies to so many springs, ready to exert their tensile force in the powerful manner exhibited. He then proceeded to demonstrate that many bodies which were usually regarded as manifesting but a weak tendency to undergo chemical action, could be made, by altering slightly their condition, to exhibit it in a powerful degree. In illustration, some finely-divided metallic iron was burned in the flame of a spirit lamp, and by comparison the lecturer proved that this metal was much more combustible than carbon or gunpowder. He next proceeded to enlarge upon the consequences which attend the application of these phenomena to various purposes, dwelling particularly upon the nature of the light which was afforded, and the data which it presented for determining chemically the constitution of complex substances. He concluded his interesting lecture by exhibiting the magnesian and electric lights side by side, thus showing the remarkably superior intensity of the latter. Mr. Crookes, at the conclusion of his lecture, was warmly applauded.

Not the least interesting feature of the evening was the exhibition of the Chromeidoscope of Mr. E. Swift, jun., which followed Mr. Crookes' lecture. This instrument is on the principle of the colour-top of Mr. Gorham, but Mr. Swift, by his various adaptations, such as an arrangement of friction wheels and a special mode of illumination, is enabled to exhibit its effects to a large audience, and has thus succeeded in giving it a scientific character for illustrating the theory of the production of colours. In this instrument the base disk, which is about two feet in diameter, is divided into sections, exhibiting the primary colours of the spectrum. It is fixed vertically on a central axis or spindle, which can be rapidly revolved by means of the friction-wheels and winch-handle; the face of the disk being illuminated by lateral jets of gas and reflectors. On revolving the disk at a speed of about 7000 revolutions per minute, white light results; further, on placing dark cards, with various designs cut in them, on the spindle axis and on the face of the disk, and then applying motion to the whole, intermitting occasionally that acquired by the pattern cards, the play of colour which succeeds is of the most brilliant and varied order. The illustrations with this instrument were highly applauded.

The PRESIDENT said that what he ventured to express at the beginning of the evening, relative to the pleasure and instruction derivable from the various subjects exhibited and explained, he felt sure was fully realized, and he could not vacate his position of chairman without expressing his thankfulness to those gentlemen who had so largely contributed to the success of their *conversazione*. He felt assured that the audience shared his sentiments in this respect, and therefore he desired that they would join with him in offering a cordial vote of thanks to those gentlemen, and especially to Dr. Edwards and Mr. Crookes, for their very valuable services in contributing to their entertainment and instruction. The proposition was received with hearty acclamations, and the company separated at half-past ten, evidently much pleased with their evening's enjoyment.

The eighth general meeting of the session was held at the Royal Institution, on Thursday evening, February 16th; the President, A. REDFORD, Esq., in the chair. Messrs. Walter Wilson and A. J. Stephens were elected members of the Association. The donation of 'The Chemist and Druggist' was announced.

Dr. EDWARDS made a few remarks in reference to the paper read by Mr. G. F. Browne at the last meeting "On Chemical Method," and subsequently described the means lately adopted by Dr. Hofmann for proving the composition synthetically and analytically of water, hydrochloric acid, ammonia, and carbide of hydrogen: the four principal types on which the modern system of notation was founded.

The PRESIDENT announced that Mr. H. S. Evans, who was to have delivered the lecture of the evening, "On the Application of Photography to Microscopic Illustrations, with Projections of Microphotographs," was unavoidably detained in London that day. He regretted this very much indeed; however, as Dr. Edwards kindly volunteered to take up the subject, the expectations of the meeting would not be entirely disappointed.

Dr. EDWARDS enlarged upon the advantages to several branches of natural science, of the progress and improvements that were effected in optical instruments, and spoke of the efforts which numerous experimenters had been making in the endeavour to attain the same goal as Dr. Maddoc had reached so successfully.

Of the advantages to physiologists and microscopists generally, of the remarkable accuracy of the high powers—such as the 20th, 25th, even to the 50th, lately added—capable of practical employment in microscopic researches, he could not say too much, since the parts brought to view so distinctly by those high powers were of the most remarkable nature, and they opened as it were a new field for study and research.

A number of Dr. Maddoc's microphotographs were then thrown on the screen by the oxycalcine lamp, and were very much admired, on account of their delicacy and sharpness of outline. Dr. Edwards and Mr. John Abrahams gave short descriptions of the organization or habits of the subjects as they remained on the screen.

At the conclusion of the exhibition, Mr. Weightman spoke of a simple means by which some objects might be easily photographed, such, for instance, as would require an object-glass of one to two inches focus; with lesser objects he thought that amateurs would not be very successful, as the slightest vibration confused the picture. The method suggested was simply to remove the photographic lens from the camera, and to place a simple object-glass in its stead; the prepared plate being placed at any convenient distance behind it, and the object as near as possible in the true focus. He further spoke of the advantage that would be likely to be gained chemically from the extension of microphotography in the detection of adulteration, or in extending our acquaintance with the structure of rare bodies.

A vote of thanks to Dr. Edwards concluded the business of the evening.

LEEDS CHEMISTS' ASSOCIATION.

The Fourth Meeting of the session was held in the Library of the Philosophical Society, on the evening of January 11, 1865; the PRESIDENT (Mr. Haigh) in the chair.

Dr. CLIFFORD ALLBUTT, one of the physicians to the General Infirmary, etc., very kindly delivered to a large meeting of the members and their friends a discourse upon "Vitality, or the Correlation of Physical and Vital Phenomena." The following is a slight sketch of the lecture, which commenced by an allusion to the present advanced status of those engaged in the practice of pharmacy, giving them the claim to recognition from the physician as intelligent and indispensable allies, to whom he was constantly indebted for the introduction of improved remedies.

The lecturer then spoke of the ideas formerly held as to the condition of matter in a state of rest, viz. that it implied the negation of force, to which the term *inertia* was given. All inorganic bodies were supposed to have such a negative condition as their normal one. Now, however, rest is defined as the state of equilibrium between various contending forces. This balancing or neutralization of force is termed *tension*. A piece of chalk lifted in the hand is in a state of tension, since gravitation would draw it towards the earth, whilst muscular force, resulting from the complex operations of animal life, keeps it elevated. When it is allowed to fall, gravitation obtains ascendancy, tension is destroyed, and we speak of the resulting manifestation of force as *energy*. Illustrations of the same truth are found in the machinery of a watch and in a crossbow, etc. We may define the motion seen to occur in all these instances as the conversion of rest into energy.

The thermo-electric pile and astatic galvanometer were introduced to show the transformation of heat through electricity into motion. A multiplying-wheel gave friction to a brass tube containing ether, which boiled and exploded its cork. An electric telegraph instrument showed the conversion of chemical affinity exerted in the battery into galvanism and motion in the index. The conversion of motion into magnetism in the well-known experiment with a poker, and other illustrations were alluded to, establishing and elucidating the doctrine of the correlation of force.

The indestructibility and conservation of force were next treated. One of the simplest cases is that of a falling body, where the force exerted in the fall appears to be lost when it is arrested, but when carefully observed is shown to have taken the new form of heat. Mayer's mechanical theory of heat is the expression of such facts, which are more precisely exemplified in the experiments of Joule, who found that one pound falling 772 feet raised a pound of water 1° F. in temperature. Shooting-stars have been calculated to attain a temperature of 360,000° F. by friction against our atmosphere,—a heat sufficient to dissipate their most solid constituents into gases of the greatest tenuity. In recent target experiments at Shoeburyness, flashes of light were seen which were attributed to volatilized iron.

The relations of force and matter were treated on by the lecturer, who showed that neither could exist without the other, and that each atom of matter formed a centre of force. Isomerism presented a most interesting field for inquiry as to how the same atoms could by different grouping present very various results.

Applying the doctrine of the correlation of force to vital manifestations, it was shown that man can no more exist surrounded by these forces, and still be independent of them, "than can iron be placed in the fire without becoming hot." We have got accustomed to think and speak of vitality as some distinct internal force belonging to living beings. We now know that the physical phenomena of animal life can be explained by the laws governing external forces, and may anticipate the time when it will be determined experimentally how much force an animal absorbs, and how much it gives out again. We may rest assured that the amounts will be found to be equal. In the meantime the term "vital principle," as indicating an internal force, must be given up as completely as is the use of the word "caloric" in relation to heat. The deeper our investigations into this most important subject, the more confirmed would be our reverent sense of how much there was relating to man that must ever be a mystery to our finite senses.

The cordial thanks of the Association were voted to Dr. Allbutt on the motion of Mr. Harvey, seconded by Mr. Thompson.

The Fifth Meeting of the session was held February 8, 1865; the PRESIDENT in the chair.

Mr. E. THOMPSON read a paper "On the Pharmacopœia of the United States." He commenced by pointing out that a similarity in race, language, and literature between the people of the United States and ourselves, gave an interest to all books issued by them which did not apply to those published in other countries, as, for instance, those of the continent of Europe. In medicine, as an inexact science, national peculiarities exercise much influence of a kind not felt in relation to exact sciences like astronomy. Thus the use of particular remedies is often confined to particular countries. The system of therapeutics of the United States may be broadly considered to be identical with our own, possibly our American brethren being too ready to adopt new remedies, whilst we are apt to adhere to those which modern research has shown to be useless. The authority attaching to the United States Pharmacopœia is quite different to that recognized in our own. There is no law to command its exclusive use. It takes its origin in a voluntary association of physicians and chemists, consisting of delegates from the incorporated colleges, etc., of medicine and pharmacy throughout the country. Thus the druggist meets the physician upon equal terms in settling the standard by which one party is to prescribe, and the other to dispense. The work is revised every ten years; the issue of the present, which is the fourth, having been in 1863.

The arrangement of the work is very similar to that of our own. Tables are given of the alterations made upon the last edition. The ordinary list of the Materia Medica is followed by what is called a "Secondary List" of such drugs as have not attained sufficient standing to be admitted to the "Primary List," or of drugs falling into disuse.

Troy weight is adopted, but the use of the term "pound" is avoided. The ounce is also called "troy ounce." The drachm and scruple are not used, but their value given in grains. For measure, the pint of sixteen ounces is employed, the ounce being subdivided into drachms and minims. We may see in these arrangements more wisdom than has characterized the action of British legislation, since old names are not appropriated for new weights and measures, as in the case of our pound, pint, and ounce. However, it appears strange that in a country with a decimal system of coinage, the above antiquated system of weights and measures should have lasted so long.

Much difference of opinion has existed in our own country as to the process best adapted for the preparation of tinctures. It might have saved trouble had the conditions been first determined which favoured either percolation or maceration. To order percolation, without defining the shape of the percolator, the fineness of the powder used, or the pressure in packing, was leaving too much to the discretion of the operator, and was calculated to bring the process into discredit. The instruction of the British Pharmacopœia would indicate a compromise between the advocates of the two plans. The United States Pharmacopœia adopts percolation wherever applicable, but gives specific directions for each case. In the first place, five degrees of fineness of powder are defined. A powder passed through a sieve of 80 or more meshes to the linear inch, is designated as *very fine;* through one of 60 meshes, *fine;* through one of 50 meshes, *moderately fine;* through one of 40 meshes, as *moderately coarse;* and through one of 20 meshes, as *coarse.* In the preparation of tinctures, the degree of fineness of the powder is always indicated. The shape of the percolator, whether cylindrical or conical, is also indicated, and the degree of pressure to be used in packing the ingredients.

The United States Pharmacopœia admits a class of preparations called Fluid Extracts. They may be described as tinctures concentrated by evaporation or distillation, sometimes with sugar added. A waste of alcohol would be an objection to some of them, but they appear to deserve notice. There are more than twenty such preparations.

Mr. THOMPSON concluded by giving it as his opinion that the British Pharmacopœia would not suffer by a general comparison with the United States Pharmacopœia, and especially drew attention to the much fuller information as to tests of purity and strength given by our own work.

Mr. F. M. RIMMINGTON, of Bradford (a Corresponding Member), favoured the Association by the exhibition and description of an extensive series of microscopic slides illustrative of the constituents of opium. The method of investigation was that adopted by Messrs. Deane and Brady, and the illustrations served to confirm the statements of those observers. The attention of the members was particularly attracted by the appearance of narcotine under polarized light, and by the fine massive crystals of codeia. The latter constituent was a predominant feature of various specimens of Liq. Opii Sedat. Mr. Rimmington also exhibited some slides containing the principles of tincture of opium, precipitated by ammonia. He thought that there were advantages in using this means of discrimination; and whilst admitting that the whole subject was one deserving of continued research, considered that it held out fair promise of much practical utility.

Mr. W. SMEETON proposed, and Mr. S. TAYLOR seconded a vote of thanks to the authors of the papers.

MEETING OF CHEMISTS AND DRUGGISTS AT YORK.

The local secretary of the Pharmaceutical Society having received a circular from the general secretary in London, enclosing a copy of the proposed Bill for regulating the qualification of chemists and druggists, intended to be submitted to Parliament in the next session, with a request that he would procure signatures from the York chemists and druggists in his favour,—he, on consultation with the local secretary of the United Society of Chemists and Druggists, came to an agreement to call a general meeting of the trade, in order that the Bill of the United Society might be considered along with it. Accordingly, on this understanding, a circular was issued and a meeting of the trade took place at Mr. Beal's, the King's Arms Hotel, on Friday, the 20th of January, which was respectably attended, Mr. Dennis being appointed Chairman. Amongst those present were councillors Thomas Cooper, C. Croskill, and J. Brown, Messrs. R. Dresser, W. Bowman, T. P. Bulmer, J. Oglesby, T. Siddall, J. Wood, W. Wilson, etc. The Chairman briefly introduced the business of the meeting, and called upon the respective secretaries to read over the proposed Bills. Previous to the Pharmacy Bill being read, Mr. Brown, Secretary of the United Society of Chemists and Druggists, stated that the Bill of that society was a right and proper measure in every respect for the governance and regulations of the chemists and druggists throughout the United Kingdom, and provided everything necessary for their incorporation; he had only one fault to find with it, and that was, it went rather too far; in his opinion, the prohibiting all persons except registered chemists and druggists from selling and dealing in drugs (however desirable it might be) was what the Legislature would not sanction. It would then have to be defined what a drug was, which would be a most difficult matter, and whether grocers, hucksters, and country shopkeepers should be prevented dealing in carbonate of soda, tartaric aicd, salts of senna, sweet nitre, and the common-going tinctures. He had no interest in its continuance—far from it; but they must look upon the question as business men, and they would see it was against the public interest and convenience to legislate in that way. Let them ask the question of themselves, and they would confess they were traders and dealers, and not pure chemists, keeping and selling an infinite variety of articles that had no connection whatever with the drug-trade; therefore, however much it might be regretted that numerous accidents arose from the ignorance and negligence of unqualified persons dealing in drugs, yet he was convinced the public convenience required that such articles should be obtained in places where a qualified druggist could not support himself. He also stated that it was his opinion that Parliament would not pass either measure in its present form, though the Pharmaceutical Society was most likely to obtain the support of Government, being already incorporated, and had gained a status through Acts of Parliament. He candidly owned he should give the Pharmacy Bill his support, providing the Council of that Society would come down a little from their pretensions, and meet fairly those who were not members of that Society, but as yet they had ignored the existence of the United Society. The Pharmaceutical Society was however a small body compared to the great mass of druggists in the country, and for himself he could not see that a pharmaceutist was any better, or possessed more knowledge, than an ordinary chemist and druggist. He would give honour where honour was due, and he would say, all honour to that gentleman who was there in that room, who had obtained his title as a Pharmaceutical Chemist by examination; but in what respect (and he spoke with all deference to those members of the Society) were they considered, either by themselves or the public, superior to those for whom the Pharmaceutical Society were now anxious to legislate? He stated there boldly, had it not been for the United Society, who had stirred in the matter with proposals for the incorporation of the trade, nothing would have been heard of the Pharmacy Bill; they had rested on their oars, and had neglected the very object for which the Society was originally founded; they had even done worse than that, for they had encouraged the Medical Council in their monstrous measure, and had conspired to hand over all non-members to the tender mercies of the medical profession. So, rather than have two societies, one of which would prosper whilst the other would gradually die out, they came forward to subject those who did not belong to them to their own control, and levy contributions upon their victims, without giving them any voice in the management of the Society. He had come there, however, to support the Pharmacy Bill, providing those present agreed to the amendments of certain clauses in that Bill which he had drawn up,—reasonable amendments, which he fully believed would meet with their concurrence. He should also move a resolution embodying those amendments, and calling upon the Councils of the two Societies to come to terms, and mutually sink their differences; so that a real union of the trade might take place for the benefit of all, and for the future interests of succeeding chemists.

Mr. Cooper, the local secretary of the Pharmaceutical Society, then read the circular from the Society, and commenced with the Pharmacy Bill, clause by clause. Considerable discussion took place upon the first, fourth, and sixteenth clauses, as well as on Schedule "C," and Mr. Brown moved the amendments of which he had spoken, which were unanimously agreed to.

On the discussion of the first clause, Messrs. R. Dresser and Croskill moved and seconded an amendment to exempt all present apprentices (as well as assistants) from the operation of the Act; and it was stated that all preceding Acts of Parliament contained such exemption. This was agreed to, and all succeeding clauses and Schedule "D" were ordered to be altered accordingly.

Mr. Brown remarked there was no provision in this clause, or anywhere in the Act, providing, in case of death of a registered chemist, for saving the rights of his widow or of his children in the interests of his business. It would be a very serious matter to many families, if, in case of death, where a family was dependent upon such business, and where a son was young, or at all events under age, and where the business had been intended for him, that it should be disposed of to another party; such a state of things would in many instances produce great hardships. He thought a clause should be introduced to remedy this defect, and that a registered assistant should be allowed to manage the business. He moved to insert a clause, which was seconded by Mr. Cooper, and unanimously agreed to.

On Clause 4 being read over, Mr. Brown said it was of such a nature as would meet with his most strenuous opposition. Was it to be borne that the Pharmaceutical Society should pounce upon respectable chemists and say, although you are in business, we will register you, and charge you a guinea for doing so? We will tax you, but you shall have nothing to do with the disposal of the money. We will also fix another mark of degradation upon you: we will compel you to produce a certificate from a medical man, stating you have been in business from a certain time for the compounding of his or other doctors' prescriptions, when at the same time your neighbour, who is a Pharmaceutist by payment, is not asked a question, though he is less competent than yourself in the business. He asked, why should this distinction be made? He had no objection to be registered, but had a great objection to pay for being so when he was already in business, and no person or society could legally prevent him. He thought Schedule "C" was humiliating to him and the whole body of chemists who were non-members. For these reasons he should move that the clause be struck out, and an amended one be introduced, doing away with the one guinea fee, as well as the obnoxious schedule; as, with the safeguards introduced in other clauses, it was quite sufficient to fill up Schedule "B," and no person could possibly get on the register who was not fully entitled to be there.

An animated discussion took place on the original and the amended clause (which was seconded by Mr. Croskill), when the amended clause was agreed to unanimously. Amendments were moved on Clauses 5, 6, 8, and Schedule "D," introducing apprentices, according to a previous resolution, and in Clause 6 an amendment was carried that the fee be fixed at not exceeding half-a-guinea.

Mr. J. Brown said he agreed to all the following clauses except Clause 16, which he said still betrayed that illiberality to the general body of chemists which he had previously commented upon. Was it to be believed that the Council of the Pharmaceutical Society were serious in expecting the registered chemists would pass the Minor examination in order to become Associates, to pay an annual subscription and yet not to be admitted as members? The proposition was ridiculous; he himself was for union, and why could not the Society say, once for all, to the trade, We are anxious to get a Bill that will satisfy you; we will respect all existing interests, and though we cannot compel you to subscribe your guinea annually, and become a member, we will give you the opportunity of becoming one should you desire it? He himself, and he doubted not many others would join, should such a clause be passed, and it was in the interests of the Society itself that he should move it. The amended clause would allow registered chemists and their assistants to become members and associates of the Pharmaceutical Society on application to the Council, and by paying the same annual subscription, to have and exercise all the rights belonging to present members and associates.

Mr. T. Cooper said, as the local secretary of the Society, he had great pleasure in seconding the amended clause, as he was convinced it would benefit the Society, and would be accomplishing an object he had long considered most desirable. It would gain for the Society an increased support from the great body of respectable chemists who were not non-members, but who under the Act would become registered; and he thought it was desirable on the part of the Society to be more liberal to non-members than the proposed Bill appeared to be.

Messrs. Dresser, Croskill, Bulmer, and others offered some additional remarks, when the Chairman put the question of the amended clause, which was unanimously agreed to.

Mr. Brown then read over the Bill of the United Society, and afterwards moved the resolution, with the amended clauses, which is appended to this report. It was seconded by Mr. Dresser, and carried unanimously.

A vote of thanks was accorded to the Chairman, who duly acknowledged the compliment, and stated it had afforded him great pleasure to preside over so united a meeting.

A vote of thanks was also passed to Messrs. Cooper and Brown, the secretaries of the respective societies, for their services in connection with the meeting, who in responding thereto gave expression to their views and wishes for the union of the whole body of chemists and druggists, and hoped that the proposed amendments then agreed to by the York druggists would be supported in other towns; so that the two Societies might be impressed with the absolute necessity of harmonious action, and might agree to a measure acceptable to the whole trade.

The meeting shortly after broke up at a late hour, a dinner having been agreed upon to take place during the winter, to cement the friendly feeling displayed towards each other by the York chemists.

At a meeting of the Pharmaceutical Chemists, and Chemists and Druggists, held at the King's Arms Hotel, York, on the 20th of January, 1865, Mr. George Dennis in the chair, the following resolution and amended clauses of the proposed Pharmacy Bill were unanimously agreed to, and ordered to be forwarded to the Council of the Pharmaceutical Society of Great Britain, and the Executive Committee of the United Society of Chemists and Druggists:—

Resolution.—Moved by Mr. J. Brown, seconded by Mr. Dresser, and carried unanimously,—that the York Pharmaceutical Chemists, and Chemists and Druggists, being in public meeting assembled to consider the proposed Bills of the Pharmaceutical Society and the United Society of Chemists and Druggists, for the future regulation of the trade, cannot agree to either of them as at present proposed, but most strongly recommend, for the sake of union, in order that a practical measure may be passed by the Legislature, that the Council and Executive Committee of the two Societies (casting all jealousy and illwill aside) will mutually agree upon a Bill that will satisfy pharmaceutists and chemists and druggists.

In order to assist so desirable an object, this meeting would submit that the proposed Pharmacy Bill of 1865 might be so altered by substituting the amended clauses hereafter named, by introducing clauses protecting the interests of widows and their families on the death of the registered chemists, and an exempting clause from serving on juries; also the striking out, as superfluous and humiliating, the obnoxious schedule "C."

Clauses 1, 5, 6, 8, and Schedule "D."—Apprentices previous to the passing of the Act to be registered and placed upon the same footing as assistants, the clauses named and scheduled to be altered accordingly.

Clause 4.—Any person who before the passing of this Act has been, or who on the 1st day of January, 1866, shall be actually carrying on business in Great Britain as a chemist and druggist, in the keeping of open shop for the compounding of the prescriptions of duly qualified medical practitioners, shall be entitled to be registered on producing to the Registrar a declaration according to the form in Schedule "B" to this Act, signed by him; or upon transmitting to such Registrar information of his name and address, and enclosing such declaration as aforesaid.

Clause 6.—All persons who are or shall be duly registered as assistants, associates, or apprentices under or according to the provisions of the Pharmacy Act, shall, on commencing business as chemists and druggists, be registered as chemists and druggists on payment of a fee not exceeding half-a-guinea, to be fixed by the Council of the Pharmaceutical Society.

Clause 16.—Every person duly registered as a chemist and druggist, having been in business as aforesaid, shall be eligible to become a member of the Pharmaceutical Society of Great Britain; and every assistant and apprentice, also duly registered previous to the 1st day of January, 1866, may also become an associate of the said Society upon application to the Council thereof, such persons paying the same annual subscriptions as are at present paid by existing members and associates respectively; and all such persons so admitted shall have the same rights and privileges as belong to present members and associates.

Clause .—That all chemists and druggists registered under this Act shall be exempt from jury service.

Clause .—That on the death of a registered chemist and druggist, his widow or trustee may carry on the said business, under the management of a duly qualified assistant, registered under this Act.

Schedule "C" to be struck out.

Signed on behalf of the York Pharmaceutical Chemists, and Chemists and Druggists.

George Dennis, *Chairman.*
Thomas Cooper, *Secretary, Pharmaceutical Society.*
John Brown, *Secretary, United Society C. D.*

ORIGINAL AND EXTRACTED ARTICLES.

TINCT. FERRI PERCHLORIDI.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In the last number of the Journal I see a suggestion of Mr. Holloway's for a formula for the Tinct. Ferri Perchloridi, and though speaking well of the result, he states that he has not yet had time to test its keeping qualities. As I make my tincture by a slight modification of the same plan, I beg to say that it yields a perfectly bright and *stable* tincture of uniform strength; and though the process is somewhat troublesome, the result leaves nothing to be desired.

My plan differs only from Mr. Holloway's in that I employ the sulphate instead of the iron itself. I take a calculated quantity of the sulphate of iron, add half an equivalent of sulphuric acid, oxidize by means of nitric acid at a sufficiently high temperature, precipitate the peroxide with ammonia, wash thoroughly, and dissolve without drying in the hydrochloric acid; evaporate carefully to the required bulk, which must be somewhat over the quantity of acid first added, to avoid loss, and lastly, make up the quantity with spirits of wine. There still remains, of course, the action of the acid on the spirit; but even allowing this to be an objection, it is not a question for the pharmaceutist so long as the Pharmacopœia orders a tincture and not a liquor.

In making the tincture directly from the anhydrous perchloride, as suggested by Dr. Attfield, would not the difficulty of weighing be overcome by having a standard solution of specific gravity, which, on dilution with a prescribed quantity of spirit, would yield a tincture of the required strength?

Your obedient servant,

CHARLES EKIN, F.C.S.

Bath, February 23, 1865.

THE PHARMACY BILL.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—As circumstances over which I have no control prevent my going to London to represent in the Pharmaceutical Council the views which I know are held by a considerable number of thinking men in our body, I take the liberty of asking for space to say a few words about our proposed Pharmacy Bill.

Towards the conclusion of your leader in the current number of the Journal you hold up, as unworthy of credence, certain anonymous opinions. I now beg to claim those opinions as my own, and shall endeavour to show briefly the grounds of their tenure.

If I am not mistaken, dispensing and the sale of drugs were formerly carried on almost exclusively by the apothecary; a restriction was then placed upon the name "apothecary," and another class of men sprang up, who now, under the title of Chemist and Druggist, do this work. At the present time it is proposed to restrict the titles of Chemist and Druggist, and I have no doubt if this is done some other title will, in the course of fifty years, become a common designation under which our trade will be carried on, excepting in so far as the *trade* itself, as well as the title, is placed under restriction.

The only step practically valuable to the public, and permanently elevating to the trade, will be to place the *trade*, and not the name, under suitable regulations.

You appear to think that the business of Chemist and Druggist is not likely to be carried on under any other title than that just quoted. I expect in some parts of the country experience already shows the mistake under which you labour. Taking up a sample book of labels issued by a local printer to his customers, I find a considerable number of labels actually in use in which the words Chemist and Druggist have been avoided, as if they had already been debarred, and abundant evidence of the many ways in which dealers in drugs might designate themselves. Take, for example, these from labels on which neither of the words Chemist or Druggist is used. There were several on which the heading was simply "Medical Hall," the name of the proprietor being at the foot of the label; others had "Medical Hall, J. S. proprietor;" "National Medical Hall;" "F—— Street Medical Hall;" "L—— (name of a town) Medical Hall;" "B——'s (name of a person) Medical Hall;" "Western Medical Hall;"

"Commercial Drug Hall;" "Apothecaries' Hall;" "Medical Establishment;" "W——'s Medical Establishment;" "Y——'s Drug and Chemical Establishment;" "Laboratory," etc. It is quite unnecessary to argue that if a restriction were placed upon these designations, the same ingenuity would find abundance of others under which to carry on the trade, especially when there was the further inducement to do so, which would follow a restriction not at present prohibiting the title of Chemist and Druggist.

You do not believe "that the retail sale of drugs could be profitably conducted if separated from dispensing, unless under exceptional circumstances." Had you expressed the conviction that dispensing the prescriptions of legally qualified medical practitioners was a branch of business quite unimportant to nine-tenths of provincial druggists, you would have better expressed the general feeling of the country. There is not one country druggist in a hundred who could live by his dispensing. There is not one in a hundred who could not live almost as well as at present without it. Evidence of this may be found at Bloomsbury Square by those who are desirous of arriving at the truth. One day last summer, when examining a candidate under the Minor examination, I was led to ask if he ever saw any dispensing; he replied, "Yes; they made up prescriptions sometimes." The form of reply induced me to ask, "How often?" To which he answered, "About one in the week." This did not astonish me, knowing, as I do, how frequently country towns have many druggists and no physician. I did not pursue the matter with other students who passed through my hands, as I had not this argument in view at the time; but no doubt a similar tale would have been told by others from the provinces.

I quite agree with you in thinking that "it was important in framing the Bill, and submitting it in a tangible form to those who will be most immediately affected by it, and whose expressed opinions will have much weight with the Legislature, that it should contain as few debatable points as possible;" but I do not agree with you in thinking that "in this the Council have been eminently successful."

I have not succeeded in convincing my fellow-members of Council that something better than the proposed Bill could be accomplished, and probably accomplished with less difficulty than the Bill in its present form; and in retiring from the governing body, I wish to convey to my electors that though I have not been successful I have not been unthinking in this matter. I have objected to the Bill in its present state because I think it will leave the public unprotected, and the practice of the drug trade almost unaltered; because it will still leave the necessity for a Poison Bill, and the probability of our having to oppose poison bills of an impracticable or obnoxious character. I have objected to the Bill because it is felt to be unfair towards some of those who do not belong to our Society, registering them on a list inferior to that occupied by the members of the Pharmaceutical Society,—the distinction being nominally, but not really, one of qualification, the inferior register containing many able and well-informed men, and the superior containing, as it unavoidably will do for years to come, the names of some who, as far as regards qualifications, are unworthy of the position. Thus it will at once do an injustice to the public and to the non-pharmaceutical members of the trade.

Besides the objections to having the Bill *passed* in its present form, there are objections to *having it brought forward* in its present form; because it is likely to rouse the opposition of those who belong to the United Society or to no society, because it will be wanting in that sympathy which a poison bill would meet with, both at the hands of the Legislature and the public, and because it gives some grounds for the assertion that it is a selfish measure, having party objects in view. Nothing is so sure to deprive us of public sympathy and support as an apparent desire to pass a public Bill for our own purposes.

You have said that the Council have adopted a middle course, avoiding both extremes. It must be remembered that good as well as evil is often avoided by this course. The Society will not gain the numerical strength which the liberal policy would have ensured, nor will it effect the desirable reformation which the stringent measure was calculated to bring about. It is also to be remembered that these extremes are not incompatible. A measure *must* be liberal towards existing interests if it is to be stringent in its future action. Both extremes should have been brought into full play, the utmost liberality towards all now exercising the calling, and the greatest practicable stringency to prevent the future practising of the trade by incompetent persons. Such a proceeding would ensure the hearty support of all parties concerned; and if, as has been suggested, Government objected to our again admitting unqualified men to the register of Pharmaceutical Chemists, that is a point which might be settled in the Committee of the House of Commons, leaving us at least the credit of having done what we could in a liberal and neighbourly spirit.

Your correspondent "O." proposes to dispose of the registration fees as an addition to the Benevolent Fund, with the object of disarming the assertion that we desire to appropriate them selfishly. Under present circumstances, I think such a course highly desirable, but I would rather have seen our policy so unselfish in its character throughout, as would have superseded the necessity of any such proposition.

If I were remodelling the Bill, I would prefer to have it rest upon one simple a point, that of requiring all dealers in poisons enumerated in a schedule to pay to Government an annual sum for license to deal in such articles, whether the tradesman applying for it was a Pharmaceutical Chemist or a grocer: that up to certain date licenses should be granted to any one applying and paying for the same, and renewable during the life of the holder; but new licenses not to be granted to any one without his producing evidence of having passed an examination before some legally constituted board. I have been met with the statement that Government would not institute a license except in connection with excisable articles. This, however, is a point to be tried, and I see no reason to think Government so conservative as to refuse a project of this kind, which would be good in its object, easy in practice, and a source of profit to themselves.

BARNARD S. PROCTOR.

11, *Grey Street, Newcastle-on-Tyne.*

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The opinion expressed by Mr. Smith at the Liverpool meeting (reported in the Pharm. Journ. for this month), that the chemists and druggists are unjustly treated in the new Pharmacy Bill, because it does not propose to admit them as members of the Pharmaceutical Society at one sweep, without examination or any other condition, appears to be shared by some of our more prominent provincial members, who also seem to consider it unwise and unjust, thus, as they say, to perpetuate two grades amongst the chemists and druggists; and argue that as many of the present members have not become so by examination, therefore all who wish to join the Society NOW, ought likewise to be admitted without examination.

I cannot bring myself to agree in this view of the matter, and think it must result from a consideration of one side of the question only. I do not say the Pharmacy Bill might not be improved, but I trust we shall never see a measur to abolish the distinction between pharmaceutists and non-pharmaceutists carried into effect. The Pharmaceutical Society might possibly have done more than has been done, but it should be remembered that it has had to encounter much (at least passive) opposition and indifference from the trade generally, and has in too many instances received only a half-hearted support from many of its own members. Nevertheless, it has gained such a position and so much influence, that connection with it is becoming every day more sought after, and the title of Pharmaceutical Chemist is beginning to be looked upon as an indication that the person using it has passed an examination to enable him to do so, or, at least, that he has had several years' practical experience in the business. Were an Act to be passed admitting *all* in the trade to be members,—and *all* must, if *any*—there could be no exceptions,—the ground already gained would be entirely lost; the non-pharmaceutist would not be elevated to the position of the pharmaceutist, but the latter would be dragged down to the level of the lowest class in the trade, and the man who has passed the most stringent examination would have nothing to distinguish him in the eye of the public from the most ignorant shopkeeper who has put a blue bottle into his window and calls himself druggist. Would such a result be desirable, or would it be just? It is true that many of the members are only so by "paying for the privilege," but their number is annually diminishing, and the majority of them are at least equal in position and attainments to non-members of the same standing; besides, it should be remembered that they are the men who founded the Society and for many years were its principal supporters, and that when the Society was established there could only be one course adopted, viz. to admit as members all who were in the trade and chose to offer themselves,—just as the United Society does now.

It is much to be regretted that any of our examined members should approve of or sanction the sneering language used by other parties in speaking of our older and non-examined members, seeing that had it not been for them the Society would never have been formed, or at least continued, and that without their money, which is made a reproach to them, the examinations could not have been brought into practical effect. I would rather say, give all honour to those men who for twenty years and more, without any prospect of advantage to themselves, have furnished the means and appliances whereby we have been enabled to prosecute the studies necessary to pass our respective examinations; they surely are entitled to our respect, and have earned a right to any privilege the Pharmaceutical Chemists may possess, and ought never to be spoken of with the scorn and contempt too often used.

I think it was quite right, and good policy, for a limited period after the passing of the Pharmacy Act, 1852, to admit those who were then in business, without requiring them to pass an examination; because in those early days many had scarcely heard of the Society, or at any rate had had no opportunity of joining it before examination was made the condition of admission, but they certainly did not expect that it was to confer any great privilege, and numbers of them dropped off after two or three years, when they found that there was "nothing to be *got* by it." But the case is very different now, the Society has gained a position of such influence as to make it an advantage to be connected with it; and these people all want to be Pharmaceutical Chemists.

I cannot see that the non-members have any right to complain, or any reason to feel aggrieved, because the Society does not propose to admit them as members, seeing that when membership was of comparatively little advantage and brought no privilege, they despised and rejected it, and refused either to contribute to its support or add to its influence by joining it, and I cannot admit the justice of their claim to be admitted, as one may say, "duty free" now, when membership brings some privilege and influence.

I have no wish to disparage the non-members nor to underrate their influence, and am quite ready to admit that there are numbers of them quite as well qualified to be members as any who are so now, and whom I should be glad to see amongst us; but these are precisely the persons on whose account the practical examination for men established in business was instituted as a means of admission, and if they are as well qualified as we are led to suppose, they can have little difficulty in passing it, which would surely be a much more satisfactory and more honourable mode of joining the Society than to be floated in on the same level with those red-and-green-bottle men, whose future admission to the trade it is considered by all parties desirable to prevent. But admitting all this, I contend that we who are Pharmaceutists ought *first* to consider the interests of our own Society, and, when advocating the claims of others, ought to take care that no injustice is done to our own members. Surely men who have supported the Society more than twenty years, as well as those who have passed its examinations, are entitled to any privilege or position it is able to give them, and in which I cannot admit that persons have any claim to participate who have neither done one nor the other, but have rather been opposing us all these years.

As to the supposed injustice of perpetuating two grades, and the consequent indignity to which the chemist and druggist is thereby subjected, it is, in my opinion, totally imaginary, and, but for the jury question, would never have been heard of; *that* is the great grievance of the United Society and its supporters, and were a similar exemption granted them (which for my part I should be glad to assist them in obtaining), we might use any title we chose without any objection on their part. Moreover these distinctions exist in all the professions without being thought either unjust or degrading, and there is no reason why they should be with us. Besides, differences in social position, in degree of education, and in amount of scientific acquirements, will always exist amongst chemists, and it cannot surely be considered either a hardship or injustice that the man of talent and industry who strives to elevate himself and to advance the progress of pharmaceutical knowledge, should have something to distinguish him from those who are content to be mere sellers of drugs, and who take no interest in pharmacy unless they can make money by it. I must not be understood here as speaking of all the non-members, but only of a class of which there are too many examples.

Let us, then, keep faith with the medical profession, the public, and our own examined members, by continuing to make examination the condition of admission to the Society, and all who are really qualified and desirous of joining us will find means of doing so; but let us not, by throwing open the Society to all in the trade, reduce all to the same level, and thus undo all that for the last twenty years we have been endeavouring to do.

Yours truly,
W. WILKINSON.

Manchester, February 10, 1865.

P.S.—Since writing the above, I have seen a report of the York meeting in the 'Chemist and Druggist.' I am sure the local secretary there must consider it a happy thing that in the Pharmaceutical Society the utmost freedom of speech and opinion is allowed to the local secretaries, and that the Council do not visit the "moral turpitude" of having and expressing views in opposition to their own by "summary dismissal of the delinquents from office." Had he been an official appointed by the "Vehmgericht" of the Executive Committee, his punishment and dismissal from office would have been swift and certain. Indeed, I almost wonder that this has not been the fate of their own honorary secretary, seeing that he professed to be disposed to support the Pharmacy Bill (with amendments); but I suppose his delinquency was condoned, and his "moral turpitude" forgiven, in consequence of his having succeeded in playing first fiddle, and making our local secretary play a very indifferent second.

As to their amendments, I do not see anything to quarrel with, except that in clause 4 I would suggest that registration and keeping the register must be attended with some little expense, and that as the United Society require a guinea for registration and annual payment of ten shillings and sixpence, the Pharmaceutical Society are not very grasping in requiring a similar fee but *no annual payment.*

Clause 16 I need not remark upon.

THE PROPOSED LEGISLATION AND THE BENEVOLENT FUND.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I think the proposition of your correspondent "O." so good, and so likely, if agreed to, to produce most important results in reference to our coming Parliamentary campaign, that I cannot forbear asking you to insert this note calling attention to it, on the part of the principal parties concerned,—the Council of the Pharmaceutical Society, and the chemists entitled to registration under the proposed Bill.

It is my opinion that our Society, being now tolerably well-off for funds, could very well afford to incur without assistance the cost of a new Pharmacy Bill. Let it, then, abstain from profiting by the registration fee, generously applying it to the much-needed increase of our *common* benevolent fund.

I believe that by so doing a vast amount of the clamour against the "iniquitous tax" would be knocked on the head, whilst a permanent good would be effected to the present and future members of the Pharmaceutical body.

G.

ON THE USE OF LITMUS TINCTURE FOR INDICATING THE POINT OF NEUTRALIZATION OF ACIDS AND ALKALIES BY GASLIGHT.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—When litmus tincture is used by gaslight for the purpose of determining the point of neutralization of acids and alkalies in volumetrical analysis, it is difficult, if not impossible, to note the change with any degree of precision, in consequence of the blue colour of the litmus appearing mauve. This may be remedied by watching the change through a piece of green glass not too deep in colour. The faintest trace of blue is then readily discernible, owing to the green glass absorbing the red ray and transmitting the blue, while the change to red will show an olive tint.

The glass best suited for the purpose is that used by opticians for green spectacles. It is advisable to select the glass by gaslight, using for the purpose a few drops of litmus tincture in a tube or phial filled with water.

CHARLES M. BLADES.

52, *Edgeware Road.*

THE PRESERVATION OF LEECHES.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The constant loss sustained by retail dealers in leeches, especially by living in small towns where the demand is uncertain, has been a subject of discussion for many years.

Various vessels have been constructed, and many contrivances proposed to avoid loss, but I do not know of one which has answered perfectly.

The aquarium is perhaps the prettiest and most scientific, but there are difficulties connected with its use.

For nearly twelve months I have adopted a very simple, but very effectual remedy for the preservation of these useful creatures in a healthy condition, and securing me against loss.

I use an ordinary ornamental leech-jar, change the water daily, keep the jar clean by means of a sponge kept for the purpose; three-parts fill the jar with good spring water, and throw in ten, twenty, or thirty grains of the oxide of manganese, washed and levigated for dispensing purposes.

I consider about thirty grains is enough for 100 leeches, and renewed daily.

I now never see an unhealthy leech in my stock. I was led to adopt this plan by witnessing the beneficial effects of manganese administered to patients. If you think the above worth publication in your journal, I hope many chemists will profit by my experience, and I shall be glad to hear that the same experiment, tried by others, yields results as satisfactory.

I remain, yours truly,

C. F. Bevan.

Harwich, February 14, 1864.

SOME CURIOUS FACTS RELATIVE TO THE PRESERVATION OF LEECHES.

Although well aware how tenacious of life leeches are, still I was not prepared for the following fact regarding them:—When we sailed from Australia, in the month of February, 1862, in the Great Britain steamship, about three dozen Australian leeches were put into a wide-mouthed green glass bottle, and hung in the surgery of that ship. The water supplied to them was formed of the *condensed steam* from the boilers. Sea-water, as every one must know, is pumped from the sea into the boilers; and in the 'Great Britain,' I presume in other ships also, a condensing apparatus condenses the steam, which otherwise would escape, and converts it into fresh water, which is in general use on board. Although this water is not so delicious as "sparkling spring," still I drank freely of it, as I knew it was pretty pure. The leeches occasionally seemed uneasy, evidently from the lack of oxygen in the water, and "mounted aloft" above the surface of the water in the bottle, until, I should say, it had absorbed atmospheric air. The now-proved universality of the germs of life fully accounted for the source of their nutriment in the *condensed steam* of sea-water, else on what could they subsist? Notwithstanding the unfavourable circumstances, both as to water, great and sudden changes of climate, from the ice of Cape Horn to the heat of the tropics, etc., which the leeches had to endure, still but *two* leeches died during the entire voyage from Australia to England.

The Australian leech, which abounds in almost every river and lagoon in that country, differs but little from that in ordinary use with us. The olive streaks of the former are of a much lighter shade. I do not remember to have seen any maculated. A medical gentleman from that country told me they are found most excellent for use. They are taken by throwing a fresh sheepskin into a lagoon, to which they closely stick until it is drawn out, when they are picked off.

Last year I kept leeches in common distilled water for a long time, and found they lived very well in it. I would, however, strongly recommend some sub-aquatic weed to be put into the water with leeches, as, in my experience, and of others who have tried it, it will be found to lessen the mortality extremely; while, in addition, it obviates the necessity for changing the water so often.—*Dublin Quarterly Journal of Medical Science.*

ON THE DISCRIMINATION OF ORGANIC BODIES BY THEIR OPTICAL PROPERTIES.

Delivered at the Royal Institution of Great Britain, on Friday, March 4, 1864.

BY PROFESSOR G. G. STOKES, M.A., D.C.L., SEC. R.S.

The chemist who deals with the chemistry of inorganic substances has ordinarily under his hands bodies endowed with very definite reactions, and possessing great stability, so as to permit of the employment of energetic reagents. Accordingly he may afford to dispense with the aids supplied by the optical properties of bodies, though even to him they might be of material assistance. The properties alluded to are such as can be applied to the scrutiny of organic substances; and therefore the examination of the bright lines in flames and incandescent vapours is not considered. This application of optical observation, though not new in principle (for it was clearly enunciated by Mr. Fox Talbot more than thirty years ago), was hardly followed out in relation to chemistry, and remained almost unknown to chemists until the publication of the researches of Professors Bunsen and Kirchhoff, in consequence of which it has now become universal.

But while the chemist who attends to inorganic compounds may confine himself without much loss to the generally-recognized modes of research, it is to his cost that the organic chemist, especially one who occupies himself with proximate analysis, neglects the immense assistance which in many cases might be afforded him by optical examination of the substances under his hands. It is true that the method is of limited application, for a great number of substances possess no marked optical characters; but when such substances do present themselves, their optical characters afford facilities for their chemical study of which chemists generally have at present little conception.

Two distinct objects may be had in view in seeking for such information as optics can supply relative to the characters of a chemical substance. Among the vast number of substances which chemists have now succeeded in isolating or preparing, and which in many cases have been but little studied, it often becomes a question whether two substances, obtained in different ways, are or are not identical. In such cases an optical comparison of the bodies will either add to the evidence of their identity, the force of the additional evidence being greater or less according as their optical characters are more or less marked, or will establish a difference between substances which might otherwise erroneously have been supposed to be identical.

The second object is that of enabling us to follow a particular substance through mixtures containing it, and thereby to determine its principal reactions before it has been isolated, or even when there is small hope of being able to isolate it; and to demonstrate the existence of a common proximate element in mixtures obtained from two different sources. Under this head should be classed the detection of mixtures in what were supposed to be solutions of single substances.*

Setting aside the labour of quantitative determinations carried out by well-recognized methods, the second object is that the attainment of which is by far the more difficult. It involves the methods of examination required for the first object, and more besides; and it is that which is chiefly kept in view in the present discourse.

The optical properties of bodies, properly speaking, include every relation of the bodies to light; but it is by no means every such relation that is available for the object in view. Refractive power, for instance, though constituting, like specific gravity, etc., one of the characters of any particular pure substance, is useless for the purpose of following a substance in a mixture containing it. The same may be said of dispersive power. The properties which are of most use for our object are, first absorption, and secondly fluorescence.

Colour has long been employed as a distinctive character of bodies; as, for example, we say that the salts of oxide of copper are mostly blue. The colour, however, of a body, gives but very imperfect information respecting that property on which the colour depends; for the same tint may be made up in an infinite number of ways from the constituents of white light. In order to observe what it is that the body does to each con-

* The detection of mixtures by the microscopic examination of intermingled crystals properly belongs to the first head, the question which the observer proposes to himself being, in fact, whether the pure substances forming the individual crystals are or are not identical.

stituent, we must examine it in a pure spectrum. [The formation of a pure spectrum was then explained, and such a spectrum was formed on a screen by the aid of the electric light. On holding a cell containing a salt of copper in front of the screen, and moving it from the red to the violet, it was shown to cast a shadow in the red as if the fluid had been ink, while in the blue rays it might have been supposed to have been water. Chromate of potash similarly treated gave the reverse effect, being transparent in the red and opaque in the blue. Of course the transition from transparency to opacity was not abrupt; and for intermediate colours the fluids caused a partial darkening. Indeed, to speak with mathematical rigour, the darkening is not absolute even when it appears the greatest; but the light let through is so feeble that it eludes our senses. In this way the behaviour of the substance may be examined with reference to the various kinds of light one after another; but in order to see at one glance its behaviour with respect to all kinds, it is merely requisite to hold the body so as to intercept the whole beam which forms the spectrum,—to place it, for instance, immediately in front of the slit.]

To judge from the two examples just given, it might be supposed that the observation of the colour would give almost as much information as analysis by the prism. To show how far this is from being the case, two fluids very similar in colour, port-wine and a solution of blood, were next examined. The former merely caused a general absorption of the more refrangible rays; the latter exhibited two well-marked dark bands in the yellow and green. These bands, first noticed by Hoppe, are eminently characteristic of blood, and afford a good example of the facilities which optical examination affords for following a substance which possesses distinctive characters of this nature. On adding to a solution of blood a particular salt of copper (any ordinary copper salt, with the addition of a tartrate to prevent precipitation, and then carbonate of soda), a fluid was obtained utterly unlike blood in colour, but showing the characteristic bands of blood, while at the same time a good deal of red was absorbed, as it would have been by the copper salt alone. On adding, on the other hand, acetic acid to a solution of blood, the colour was merely changed to a browner red, without any precipitate being produced. Nevertheless, in the spectrum of this fluid the bands of blood had wholly vanished, while another set of bands less intense, but still very characteristic, made their appearance. This alone, however, does not decide whether the colouring-matter is decomposed or not by the acid; for as blood is an alkaline fluid, the change might be supposed to be merely analogous to the reddening of litmus. To decide the question, we must examine the spectrum when the fluid is again rendered alkaline, suppose by ammonia, which does not affect the absorption bands of blood. The direct addition of ammonia to the acid mixture causes a dense precipitate, which contains the colouring-matter, which may, however, be separated by the use merely of acetic acid and ether, of which the former was already used, and the latter does not affect the colouring-matter of blood. This solution gives the same characteristic spectrum as blood to which acetic acid has been added; but now there is no difficulty in obtaining the colouring-matter in an ammoniacal solution. In the spectrum of this solution, the sharp absorption-bands of blood do not appear, but instead thereof there is a single band a little nearer to the red, and comparatively vague [this was shown on a screen]. This difference of spectra decides the question, and proves that hæmatin (the colouring-matter prepared by acid, etc.) is, as Hoppe stated, a product of decomposition.

The spectrum of blood may be turned to account still further in relation to the chemical nature of that substance. The colouring-matter contains, as is well known, a large quantity of iron; and it might be supposed that the colour was due to some salt of iron, more especially as some salts of peroxide of iron, sulphocyanide for instance, have a blood-red colour. But there is found a strong general resemblance between salts of the same metallic oxide as regards the character of their absorption. Thus the salts of sesquioxide of uranium show a remarkable system of bands of absorption in the more refrangible part of the spectrum. The number and position of the bands differ a little from one salt to another; but there is the strongest family likeness between the different salts. Salts of sesquioxide of iron in a similar manner have a family likeness in the vagueness of the absorption, which creeps on from one part of the spectrum to another without presenting any rapid transitions from comparative transparency to opacity and the converse. [The spectrum of sulphocyanide of peroxide of iron was shown for the sake of contrasting with blood.] Hence the appearance of such a peculiar system bands of absorption in blood would negative the supposition that its colour is due to a salt of iron as such, even had we no other means of deciding. The assemblage of the facts with which we are acquainted seems to show that the colouring-matter is some complex compound of the five elements, oxygen, hydrogen, carbon, nitrogen, and iron, which, under the action of acids and otherwise, splits into hæmatin and globulin.

This example was dwelt on, not for its own sake, but because general methods are most readily apprehended in their application to particular examples. To show one example of the discrimination which may be effected by the prism, the spectra were exhibited of the two kinds of red glass which (not to mention certain inferior kinds) are in common use, and which are coloured, one by gold, and the other by suboxide of copper. Both kinds exhibit a single band of absorption near the yellow or green; but the band of the gold glass is situated very sensibly nearer to the blue end of the spectrum than that of the copper glass.

In the experiments actually shown, a battery of fifty cells and complex apparatus were employed, involving much trouble and expense. But this was only required for projecting the spectra on a screen, so as to be visible to a whole audience. To see them, nothing more is required than to place the fluid to be examined (contained, suppose) in a test tube, behind a slit, and to view it through a small prism applied to the naked eye, different strengths of solution being tried in succession. In this way the bands may be seen by any one in far greater perfection than when, for the purpose of a lecture, they are thrown on a screen.

In order to be able to examine the peculiarities which a substance may possess in the mode in which it absorbs light, it is not essential that the substance should be in solution, and viewed by transmission. Thus, for example, when a pure spectrum is thrown on a sheet of paper painted with blood, the same bands are seen in the yellow and green region as when the light is transmitted through a solution of blood, and the spectrum thrown on a white screen. This indicates that the colour of such a paper is in fact due to absorption, although the paper is viewed by reflected light. Indeed, by far the greater number of coloured objects which are presented to us, such as green leaves, flowers, dyed cloths, though ordinarily seen by reflection, owe their colour to absorption. The light by which they are seen is, it is true, reflected, but it is not *in reflection* that the preferential selection of certain kinds of rays is made which causes the objects to appear coloured. Take, for example, red cloth. A small portion of the incident light is reflected at the outer surfaces of the fibres, and this portion, if it could be observed alone, would be found to be colourless. The greater part of the light penetrates into the fibres, when it immediately begins to suffer absorption on the part of the colouring-matter. On arriving at the second surface of the fibre, a portion is reflected and a portion passes on, to be afterwards reflected from, or absorbed by, fibres lying more deeply. At each reflection the various kinds of light are reflected in as nearly as possible the same proportion; but in passing across the fibres, in going and returning, they suffer very unequal absorption on the part of the colouring-matter, so that in the aggregate of the light perceived the different components of white light are present in proportions widely different from those they bear to each other in white light itself, and the result is a vivid colouring.

There are, however, cases in which the different components of white light are reflected with different degrees of intensity, and the light becomes coloured by regular reflection. Gold and copper may be referred to as examples. In ordinary language we speak of a soldier's coat as red, and gold as yellow. But these colours belong to the substances in two totally different senses. In the former case the colour is due to absorption, in the latter case to reflection. In the same sense, physically speaking, in which a soldier's coat is red, gold is not yellow but blue or green. Such is, in fact, the colour of gold by transmission, and therefore as the result of absorption, as is seen in the case of gold leaf, which transmits a bluish-green light, or of a weak solution of chloride of gold after the addition of protosulphate of iron, when the precipitated metallic gold remains in suspension in a finely-divided state, and causes the mixture to have a blue appearance when seen by transmitted light. In this case we see that while the substance copiously reflects and intensely absorbs rays of all kinds, it more copiously reflects the less refrangible rays, with respect to which it is more intensely opaque.

All metals are, however, highly opaque with regard to rays of all colours. But certain non-metallic substances present themselves which are at the same time intensely opaque with regard to one part of the spectrum, and only moderately opaque or even pretty transparent with regard to another part. Carthamine, murexide, platino-cyanide of magnesium may be mentioned as examples. Such substances reflect copiously, like a metal, those rays with respect to which they are intensely opaque, but more feebly, like a vitreous substance, those rays for which they are tolerably transparent. Hence, when white light is incident upon them the regularly-reflected light is coloured, often vividly, those colours preponderating which the substance is capable of absorbing with intense avidity. But perhaps the most remarkable example known of the connection between intense absorption and copious reflection occurs in the case of crystals of permanganate of potash. These crystals have a metallic appearance, and reflect a greenish light. They are too dark to allow the transmitted light to be examined; and even when they are pulverized, the fine purple powder they yield is too dark for convenient analysis of the transmitted light. But the splendid purple solution which they yield may be diluted at pleasure, and the analysis of the light transmitted by it presents no difficulty. The solution absorbs principally the green part of the spectrum; and when it is not too strong, or used in too great thickness, five bands of absorption, indicating minima of transparency, make their appearance (these were shown on a screen). Now, when the green light reflected from the crystals is analysed by a prism, there are observed *bright* bands, indicating maxima of reflecting power, corresponding in position to the *dark* bands in the light transmitted by the solution. The fifth bright band, indeed, can hardly, if at all, be made out, but the corresponding dark band is both less strong than the others and occurs in a fainter part of the spectrum. When the light is reflected at a suitable angle, and is analysed both by a Nicol's prism, placed with its principal section in the plane of incidence, and by an ordinary prism, the whole spectrum is reduced to the bands just mentioned. The Nicol's prism would, under these circumstances, extinguish the light reflected from a vitreous substance, and transmit a large part of the light reflected from a metal. Hence we see that as the refrangibility of the light gradually increases, the substance changes repeatedly, as regards the character of its reflecting power, from vitreous to metallic and back again, as the solution (and therefore it may be presumed the substance itself) changes from moderately to intensely opaque, and conversely.

These considerations leave little doubt as to the chemical state of the copper present in a certain glass which was exhibited. This glass was coloured only in a very thin stratum on one face. By transmission it cut off a great deal of light, and was bluish. By reflection, especially when the colourless face was next the eye, it showed a reddish light visible in all directions, and having the appearance of coming from a fine precipitate, though it was not resolved by the microscope, at least with the power tried. It evidently came from a failure in an attempt to make one of the ordinary red glasses coloured by suboxide of copper, and the only question was as to the state in which the copper was present. It could not be oxide, for the quantity was too small to account for the blueness, and in fact the glass became sensibly colourless in the outer flame of a blowpipe. Analysis of the transmitted light by the prism showed a small band of absorption in the place of the band seen in those copper-red glasses which are not too deep, and therefore a small portion of copper was present in the state of suboxide, *i. e.* a silicate of that base. The rest was doubtless present as metallic copper, arising from over-reduction in the manufacture, and accordingly the blue colour, which would have been purer if the suboxide had been away, indicates the true colour of copper by transmitted light, quite in conformity with what we have seen in the case of gold. Hence, in both metals alike, the absorbing and the reflecting powers are, on the whole, greater for the less than for the more refrangible colours, the law of variation with refrangibility being of course somewhat different in the two cases.

Time would not permit of more than a very brief reference to the second property to which the speaker had referred as useful in tracing substances in impure solutions—that of fluorescence. The phenomenon of fluorescence consists in this, that certain substances, when placed in rays of one refrangibility, emit during the time of exposure compound light of lower refrangibility. When a pure fluorescent substance (as distinguished from a mixture) is examined in a pure spectrum, it is found that on passing from the extreme red to the violet and beyond, the fluorescence commences at a certain point of the spectrum, varying from one substance to another, and continues from thence onwards, more or less strongly in one part or another according to the particular substance. The colour of the fluorescent light is found to be nearly constant throughout the spectrum. Hence, when in a solution presented to us, and examined in a pure spectrum, we notice the fluorescence taking, as it were, a fresh start, *with a different colour*, we may be pretty sure that we have to deal with a mixture of two fluorescent substances.

It might be inferred *à priori*, that fluorescence at any particular part of the spectrum would necessarily be accompanied by absorption, since otherwise there would be a creation of *vis viva;* and experience shows that rapid absorption (such as corresponds to a well-marked minimum of transparency indicated by a determinate band of absorption in the transmitted light) is accompanied by copious fluorescence. But experience has hitherto also shown, what could not have been predicted, and may not be universally true,* that conversely, absorption is accompanied, in the case of a fluorescent substance, by fluorescence.

From what precedes it follows that the colour of the fluorescent light of a solution, even when the incident light is white, or merely sifted by absorption, may be a useful character. To illustrate this, the electric light, after transmission through a deep-blue glass, was thrown on solutions in weak ammonia of two crystallized substances, æsculin and fraxin, obtained from the bark of the horse-chestnut, and of which the latter occurs also in the bark of the ash, in which, indeed, it was first discovered. Both solutions exhibited a lively fluorescence; but the colour was different, being blue in the case of æsculin, and bluish-green in the case of fraxin. A purified solution obtained from the bark exhibits a fluorescence of an intermediate colour, which would suffice to show that æsculin would not alone account for the fluorescence of the solution of the bark.

When a substance possesses well-marked optical properties, it is in general nearly as easy to follow it in a mixture as in a pure solution. But if the problem which the observer proposes to himself be:—Given a solution of unknown substances which presents well-marked characters with reference to different parts of the spectrum, to determine what portion of these characters belongs to one substance, and what portion to another, —it presents much greater difficulties. It was with reference to this subject that the second of the objects mentioned at the beginning of the discourse had been spoken of as that the attainment of which was by far the more difficult. The problem can, in general, be solved only by combining processes of chemical separation, especially fractional separation, with optical observation. When a solution has thus been sufficiently tested, those characters which are found always to accompany one another, in, as nearly as can be judged, a constant proportion, may, with the highest probability, be regarded as belonging to one and the same substance. But while a combination of chemistry and optics is in general required, important information may sometimes be obtained from optics alone. This is especially the case when one at least of the substances present is at the same time fluorescent and peculiar in its mode of absorption.

To illustrate this the case of chlorophyll was referred to. An eminent French chemist, M. Fremy, proposed to himself to examine whether the green colour were due to a single substance, or to a mixture of a yellow and a blue substance. By the use of merely neutral bodies, he succeeded in separating chlorophyll into a yellow substance, and another which was green, but inclining a little to blue; but he could not in this way get further in the direction of blue. He conceived, however, that he had attained his object by dissolving chlorophyll in a mechanical mixture of ether and hydrochloric acid, the acid on separation showing a fine blue colour, while the ether was yellow. Now solutions of chlorophyll in neutral solvents, such as alcohol, ether, etc., show a lively fluorescence of a blood-red colour; and when the solution is examined in a pure spectrum, the red fluorescence, very copious in parts of the red, comparatively feeble in most of the green, is found to be very lively again in the blue and violet. Now a substance of a pure

* Fluorescent substances, like others, doubtless absorb the invisible heat-rays lying beyond the extreme red, in a manner varying from one substance to another. Hence, if we include such rays in the incident spectrum, we have an example of absorption not accompanied by fluorescence. But the invisible heat-rays differ from those of the visible spectrum (as there is every reason to believe) only in the way that the visible rays of one part of the spectrum differ from those of another, that is, by wave length, and consequently by refrangibility, which depends on wave length. Hence it is not improbable that substances may be discovered which absorb the visible rays in some parts of the spectrum less refrangible than that at which the fluorescence commences; and *mixtures* possessing this property may be made at pleasure. Nevertheless, the speaker has not yet met with a pure fluorescent substance which exhibits this phenomenon.

yellow colour, and exercising its absorption therefore, as such substances do, on the more refrangible rays, would not show a pure red fluorescence. Either it would be non-fluorescent, or the fluorescence of its solution would contain (as experience shows) rays of refrangibilities reaching, or nearly so, to the part of the spectrum at which the fluorescence, and therefore the absorption, commences; and therefore the fluorescent light could not be pure red, as that of chlorophyll is found to be even in the blue and violet. The yellow substance separated by M. Fremy, by the aid of neutral reagents, is, in fact, non-fluorescent. Hence the powerful red fluorescence in the blue and violet can only be attributed to the substance exercising the well-known powerful absorption in the red, which substance must therefore powerfully absorb the blue and violet. We can affirm, therefore, *à priori*, that if this substance were isolated, it would NOT be blue, but only a somewhat bluer green. The blue solution obtained by M. Fremy owes, in fact, its colour to a product of decomposition, which when dissolved in neutral solvents is not blue at all, but of a nearly neutral tint, showing, however, in its spectrum extremely sharp bands of absorption.

USES OF THE HORSE-CHESTNUT.

Of all the waste substances which might be profitably employed in domestic economy, there is none which has given rise to more discussion or on which so many attempts have been made as the fruit of the horse-chestnut, which contains a large quantity of starch. At various periods the utilization of this product has attracted public attention, and many speculators have essayed to make it an object of commerce.

When first introduced from Constantinople, the fruit of the horse-chestnut was considered edible; and Parkinson, writing in 1629, included it among his fruit-trees, and described the nut as of "a sweet taste, and agreeable to eat when roasted." Very little use has ever been made of the nuts in this country; though in Turkey they are mixed with horse food, and are considered good for horses which are broken-winded. When ground into flour, they are used in some places to whiten linen cloth, and are said to add to the strength of bookbinders' paste. They contain, moreover, so large a quantity of potash, as to be a useful substitute for soap, and on the latter account they were formerly extensively employed in the process of bleaching. The nuts contain a great deal of starch.

In March, 1776, Lord William Murray obtained a patent for extracting starch from horse-chestnuts, which was merely by peeling them, grating the nuts, washing the pulp several times, and baking it or drying it.

Various attempts have been made to utilize them by producing sugar and spirit from them; and on removal of the bitter principle, excellent edible fecula and maccaroni have been made from horse-chestnuts in France.

"Fécule de marrons d'Inde" is now made by H. de Callias, sold at twenty-two francs the kilo., 18, Rue de Bellevue, Passy, near Paris. The process adopted by this maker permits the purifying of the fecula without having recourse to the peeling, which was formerly considered indispensable, and hence the extraction of the starch is as easy and cheap as that from the potato. The following is given as the cost:—

	Francs.
Collection of 20,000 kilogrammes of horse-chestnuts in the park of St. Cloud	400
Conveyance to the factory of the Abbey de Val (Seine-et-Oise), belonging to M. Becappe	280
Manufacture and total other charges	200
	880

Horse-chestnuts are much used on the Continent, especially in the Rhine districts, for fattening cattle and for feeding milch cows. Hermstadt gives the following analysis of a sample dried in the air, and with 21·8 per cent. of the shell removed:—

Starch	35·42
Flour fibre	19·78
Albumen	17·19
Bitter extract	11·45
Oil	1·21
Gum	13·54
Total	98·57

Pabet estimates that 100 lb. of dried horse-chestnuts are equal in nutritive value to 150 lb. of average hay. Another authority, Petri, makes them equal, weight for weight, to oatmeal.

The starch obtained from the horse-chestnut is white, and when thoroughly washed perfectly free from any bitterness. They yield 29 to 30 per cent., and sometimes nearly 35 per cent., and contain besides a glutinous matter, which, according to Liebig, possesses eminently nutritive properties, but, which experience proves, very inferior to the gluten of cereals. Adopting the analysis of M. Chevallier and M. Lefrage, 17 per cent. may be taken as the mean yield of starch with operations conducted on a large scale; and therefore, in its starch produce, the horse-chestnut may be taken to be equivalent to the potato, which root contains about 25 per cent. in the solid state, but after deducting the pulp rarely yields more than 18 per cent. of starch.

M. Mercandier, in the 'Journal Économique' for December, 1757, stated that horse-chestnuts furnish a soapy water, proper for bleaching linen. The same observer remarks, that the pulp or residue of the starch furnishes an excellent food for the poultry of the farm-yard, and which can be employed as a fuel.

In 1780 M. Bon, President of the Royal Society of Montpellier, published a process founded on the use of alkaline leys "for softening horse-chestnuts and rendering them fit for fattening cattle in countries where acorns and pulse are not used for that purpose." About the same period an abbot of Anchin, in French Flanders, discovered a means of extracting from horse-chestnuts a good oil for burning, and obtained from their flour a weaver's starch, which was used subsequently by the weavers of Geneva.

In 1783 the 'Bibliothèque Physico-Économique' (p. 412) mentioned a means of thoroughly depriving the fruit of the horse-chestnut, by grafting and transplanting, of their natural bitterness, and thus obtaining from this tree chestnuts as sweet and palatable as those of Lyons.

At the same time the 'Décade Philosophique,' t. viii. p. 454, made known a process for removing, by simple washing in water, the bitterness and acidity of the flour of the horse-chestnut.

We find also in the Dictionary of Agriculture of Abbé Rogier, t. vi. p. 442 (1785), that a M. du Francheville obtained from the horse-chestnut the farinaceous and nutritive part which the fruit contains, by applying the process used by the South Americans for making manioc or cassava.

"In August, 1794," observes M. Chevallier, "the Lyceum of Arts informed the National Convention that, among the means of supplying the place of flour for the manufacture of paste, the Lyceum had found in the horse-chestnut materials admirably fitted for making the best pasteboard."

In another memoir, the same Institution demonstrated that in burning the horse-chestnut potash could be obtained, and that 12½ ounces of ashes yielded 9 ounces of fixed alkali (potash) of the first quality.

In a publication issued in Silesia, Biblioth. Physico-Économ., 1806, p. 150, it was shown that it is possible to obtain from the fruit of the horse-chestnut oil, flour or meal for paste, and a black colour resulting from the carbonization of the husk or envelope. These numerous citations are sufficient to prove that the idea of utilizing these fruits is by no means new.

It is stated by those well-informed, that a horse-chestnut tree of twenty years old will yield a hectolitre of fruit, and an adult tree three hectolitres; but this estimate is necessarily subject to variations according to local and climative circumstances. In France there are a large number of these trees, and in Belgium and other European countries it is quite possible to extend them where land is not valuable, or more profitably occupied.

In 1778, Parmentier, in the investigation which he set on foot at the request of the States of Languedoc, on the alimentary resources of France, placed the horse-chestnut at the head of the list of vegetable products capable of being utilized for the support of man.

Somewhat later, in 1795, Baumé directed also prominent attention to this fruit; and in the complete treatise which he published on the horse-chestnut, and its use as food, he proposed, for depriving it of its bitterness, first to peel them, and subsequently to treat the pulp by repeated washings in alcohol; but this could scarcely be employed profitably on a large scale, and at the same time. Parmentier ('Cours d'Agriculture,' t. viii. p. 202) pointed out that water could be employed with equal advantage in the place of spirits.

The experience of M. Calmus, in a memoir presented to the Société d'Encouragement of Paris, also fully demonstrated that it was quite superfluous to seek to deprive the chestnuts of their bitterness by means of agents more or less costly than simple washing in water. M. Calmus, in the memoir alluded to, proposed to utilize the water in which the fruit had been washed for lixiviating and bleaching linen, the husk or perisperm for tanning, and the marc or residue for fattening poultry and domestic animals.

Notwithstanding these well-known facts, M. Flandin pointed out in 1849 ('Comptes Rendus,' t. xxvii. p. 349) a method of removing the bitterness from horse-chestnut starch, by mixing with 100 kilogrammes of pulp one or two kilogrammes of carbonate of soda; then washing in several waters, and afterwards straining. The product thus obtained was mixed with other farinaceous substances, and constituted, according to M. Flandin, another food resource. It is probable that the employment of the soda was recommended by Hischermist, because in summer the washing-water of the fecula acidifies very quickly, and leads to the formation of a certain quantity of dextrine, which involves a notable loss of starch.

But although the removal of this bitter principle is indispensable when the starch is intended for alimentation, it is quite unnecessary if the starch is to be used for industrial or manufacturing purposes. Parmentier, in proposing to employ horse-chestnut starch to supply the place of paste made with food grains, very justly remarks that it has the advantage of not being attacked by insects on account of its bitterness; and bookbinders and makers of pasteboard frequently mix in their paste some aloes, with the object of keeping off insects and mould. It has been suggested by Parmentier and others that the fruit might also be utilized for its potash. The chestnuts are dried and burnt, and the salt obtained by lixiviating the ashes. Or, if preferred, the ashes may be employed direct in bleaching linen. Mercandier, in his 'Treatise on Hemp,' states that in Switzerland, and in some parts of France, they employ the water in which horse-chestnuts have been boiled for bleaching hemp, flax, and other fabrics, and it also supplies the place of soap.

For a great number of years M. Klose, of Berlin, has operated on a large scale on the horse-chestnut, and obtained the following products:—

1. From the burnt pericarp an alkaline ley.

2. From the skin or husk of the peach the episperm, a very fine charcoal, which forms the base of different printing inks.

3. From the amylaceous pulp is extracted the fecula, which can be transformed into dextrine, glucose, alcohol, or vinegar, and which are all adapted to industrial use.

4. The fatty matter extracted serves to make a kind of soap, and to render certain mineral colours more fixed and solid.

5. A yellow colouring-matter which serves for different purposes.

In 1833, M. Vergnaud, of Romagnesi, contributed a very interesting paper on the horse-chestnuts and its products to the 28th volume of the 'Recueil Industriel' of Paris.

Twenty-seven essays on the horse-chestnut were sent in to the Belgian Commission in 1856, in competition for the premium for the best substitute for edible substances for starch for industrial purposes, but they contained very little new matter, and were for the most part a repetition of previous information and experiments.

The use of the horse-chestnut was commenced on a large scale in France in 1855 by M. de Callias, and is still continued. He operated, as we have seen, on more than twenty million kilogrammes annually.—*The Technologist.*

MISCELLANEA.

Explosion of Benzine.—A terrible accident occurred in the port of Havre on board the Glasgow steamer 'Athanasian.' That vessel was being unloaded in the afternoon when a cask of benzine fell from the crane back into the hold, and burst, the contents running out into the bottom of the steamer. The labourers shortly after left, but returned in the evening to work by candle-light, and four men had gone into the hold with lanterns, when a loud explosion took place, and the spirit becoming ignited, the flames rushed up the hatchway. One man only, named Elie, could be rescued, and he was shockingly burnt. The other three must have perished immediately. The flames were shortly after got under, and two firemen, attached to ropes, were let down into the hold to see that the fire was quite extinguished, and at the same time endeavour to recover the bodies; but at that moment a spark from a torch fell down the hatchway and a second explosion occurred. The two firemen were quickly drawn up, but, being severely burnt, were removed to the hospital with Elie. The last named is in a critical state, but the other two are believed to be out of danger. The flames were got under a second time, and the vessel, being of iron, is not greatly damaged.

Deer Poisoned by Browsing on Yew.—It is stated that the Duke of Beaufort has lost nearly forty head of deer from their browsing on yew, the boughs of which were bent down within their reach by the snow.

Poisoning by Yew-tree Berries.—An inquest has been held at Finchley on the body of Emily Arkhurst, aged three years, who died from eating yew-tree berries in Finchley Cemetery. The child was observed by her father to eat some of the berries from an Irish yew-tree in the cemetery, but he thought nothing of it. Shortly afterwards the child was taken with faintness, and the mother administered brandy and other restoratives, also a dose of castor oil, but a relapse having taken place medical aid was obtained; however death ensued. Mr. White, surgeon, deposed that a *post-mortem* examination plainly proved that death was caused by poison. From twenty to fifty of the berries were found, some of which had passed into the intestines. Verdict—"Death by accidental poisoning."

Unalterable Nitrate of Silver Pills.—The following formulæ for preserving nitrate of silver when required in the form of pills are given in the 'Dublin Medical Press' of August 3, 1864. It is recommended that the pills should be kept in wooden boxes.

Nitrate of Silver Pills with Silica.—℞ Argenti nitratis gr. iij.; Silicæ præcipitat. pur. gr. xxx.; Mucilag. gummi tragacanthi quantum minimum. Mix the nitrate of silver and the silica with due care, and make 20 pills.

Nitrate of Silver Pills with Nitrate of Potash.—℞ Argenti nitratis gr. iij.; Nitratis potassæ gr. xxx.; Mucilag. gummi tragacanthi quantum minimum. Prepared like the preceding one.

Accidental Poisoning by Phosphorus.—On Monday, August 15th, an inquest was held at Warner Place, Hackney Road, on the body of Thomas Hill, aged 4 years, who is said to have died from the effects of phosphorus, which had been placed between slices of bread-and-butter by the father, for the purpose of poisoning rats; and it was supposed that the child had taken the poisoned bread-and-butter from the shelf and eaten it, as he was found in great agony, the fumes of the phosphorus issuing from his mouth. Dr. Latham was called in, but was unable to give any relief, and the child died the next day. The jury returned a verdict of accidental death from phosphorus, but severely censured the parents of the child for their great carelessness.

Why Bees Work in the Dark.—A lifetime might be spent in investigating the mysteries hidden in a beehive, and still half of the secrets would be undiscovered. The formation of the cell has long been a celebrated problem for the mathematician, whilst the changes which the honey undergoes offers at least an equal interest to the chemist. Every one knows what honey is like when fresh from the comb. It is a clear yellow syrup, without a trace of solid sugar in it. Upon standing, however, it gradually assumes a crystalline appearance,—it *candies*, as the saying is, and ultimately becomes a solid mass of sugar. It has been suspected that the change was due to a photographic action; that the same agent which alters the molecular arrangement of the iodide of silver on the excited collodion plate, and determines the formation of camphor and iodine crystals in a bottle, also causes the syrupy honey to assume a crystalline form. This, however, is the case. M. Scheibler* has enclosed honey in stoppered flasks, some of which he has kept in perfect darkness, whilst others have been exposed to the light. The invariable result has been that the sunned portion rapidly crystallizes, whilst that kept in the dark has remained perfectly liquid. We now see why bees are so careful to work in perfect darkness, and why they are so careful to obscure the glass windows which are sometimes placed in their hives. The existence of their young depends on the liquidity of the saccharine food presented to them, and if light were allowed access to this, the syrup would gradually acquire a more or less solid consistency; it would seal up the cells, and in all probability prove fatal to the inmates of the hive.—*Quarterly Journal of Science*, April, 1864.

Substitutes for Gutta-Percha.—A new insulating material has been recently imported by Sir W. Holmes from Demarara, which bids fair to be a formidable rival to gutta-percha. It is the dried juice of the bullet tree (*Sapota Mulleri*), and is called Balata. It appears likely to be more valuable than india-rubber or gutta-percha by themselves, as it possesses much of the elasticity of the one and the ductility of the other, without the intractibility of india-rubber, or the brittleness and friability of gutta-percha, whilst it requires a much higher temperature to melt or soften it. . . . There appears to be every probability that balata will become an important article of commerce, supplying the great want of the day—a good insulating medium for telegraphic purposes. Professor Wheatstone is now investigating its electrical and insulating properties. Another substitute for gutta-percha, the juice of the *Alstonia scholaris*, a tree belonging to the natural order Apocynea, has been forwarded from Ceylon by Mr. Ondaatjie; it is stated to possess the same properties, and to be as workable as gutta-percha. It readily softens when plunged in boiling water, is soluble in turpentine and chloroform, receives and retains impressions permanently, and is adapted for seals to documents. These specimens are sent in response to premiums offered by the Society of Arts for the discovery of a substitute for gutta-percha.—*Ibid.*

A Large Dose of Quinine.—The following case is communicated to the 'Medical Times and Gazette,' in a letter from Dr. Taussey of Rome, to Dr. Clapton of St. Thomas's Hospital:—"Dr. Hayler, a military medical man, visited in barracks a soldier, suffering from a relapse of ague, and administered to him a small dose of sulphate of quinine. At the same time, he directed a man to fetch one ounce of the same remedy from the hospital, in order that he might have it in readiness for any emergency. The man received the bottle; but, supposing that it was ordered for the patient just mentioned, he took it to him. In the presence of their comrades, they put the whole into a cup, adding sufficient water to make a paste of it; and the patient, although he found the medicine uncommonly bitter, did not leave off until he had taken it all." The only inconvenience experienced was a complete deafness and a kind of stupor; and no antidote was administered. The ague disappeared; and the man left the hospital in a week, in the best state of health.

Silkworms.—M. Onesti has found that wood-soot, if sprinkled over silkworms attacked with *fébrine*, effects an almost certain cure, or, at all events, prolongs their lives until the cocoons are finished. The Minister of Agriculture has addressed a circular to the préfets of the sericultural departments of France, and has requested that a commission be formed to report on the value of M. Onesti's discovery. A very interesting letter from M. Guerin-Menneville, printed in a recent number of 'Les Mondes,' gives many particulars of the progress of sericulture in France. Among other things, it is mentioned that M. Simon, charged with a mission to China to report on the best breeds of worms, *inter alia*, has sent home a box of eggs *viâ* Siberia, which have arrived safely, and are now being distributed, and are also being experimented on at the Imperial farm at Vincennes.

Suicide by Cyanide of Potassium.—A coroner's inquest took place on Saturday,

* Journ. de Pharm. et de Chimie, 1863.

Oct. 8th, at No. 1, Richmond Terrace, Hackney, before Mr. Humphreys, on the body of Mr. William James Groves, aged 42 years. He was a merchant in the City, and his transactions were principally on the Corn Exchange and with New York. The evidence showed that he had sustained very severe losses in connection with America, which had preyed upon his mind in a most distressing manner. On Thursday last he came to his father's house earlier in the day than the hour at which his father and brother were usually there. He asked the servant if they were at home, and, ascertaining that they were not, he went into the dining-room, ordering that a glass and some water should be brought. He then closed the door, and the room was not entered till later, when his father returned. He was then discovered lying on the couch, as though asleep, but dead. On the table stood a bottle containing a quantity of cyanide of potassium, and the tumbler in which he had mixed a supply of the poison, and from which he had drunk as much as he was able before the poison took effect. On the table beside the glass were two letters, in which he stated that his mind was going, and that he could not bear his troubles any longer, as well as a kindly and anxious reference to his wife. The medical evidence established that the deceased had been poisoned with cyanide of potassium. The jury found "That the deceased committed suicide by poisoning himself with cyanide of potassium while in a state of unsound mind; and the jury desire to draw attention to the danger of permitting the indiscriminate sale of cyanide of potassium to unknown persons, and to suggest that in all cases the purpose to which so deadly a drug is to be applied should be carefully ascertained."

Alleged Poisoning by Strychnine.—A trial has lately taken place before the Assize Court of Berne, in Switzerland, bearing some resemblance to the La Pommerais case in Paris. Charles Hermann Demme, doctor of medicine, practising at Berne, was one of the accused parties, and Sophia Elizabeth Trümpi, the widow of Gaspard Trümpi, of Glaris, banker, also of Berne, was charged with being the accomplice of Dr. Demme in the murder of her husband. On the night of the 15th of February last, Gaspard Trümpi died, and on the following day it was rumoured that he had died by his own hand, and in consequence of this and of another report that Trümpi had met with foul play, an inquest was ordered by the authorities, and Dr. Demme, as the family physician, was called upon for a report of the circumstances relating to Trümpi's death. In this report death was attributed to an apoplectic stroke. The Procureur-General of Berne ordered a *post-mortem* examination to be made by Dr. Charles Emmert and Dr. Kupper, both of Berne, and an analysis of the intestines, which was conducted by MM. Flüchiger and Schwalbach, resulted in the discovery of more than ten grains of strychnine. The notion of accidental death was therefore rejected, and the supposition of self-murder was not admitted. As it was known that Dr. Demme had been alone in the house of the deceased the night he died, and that a criminal intimacy had existed between him and Madame Trümpi, the authorities issued warrants for the apprehension of both parties. For the defence it was alleged, that although death had undoubtedly been caused by strychnine, the fact was concealed by Dr. Demme in order to spare the feelings of the family. The medical questions were again discussed before the College of Health, who came to the conclusion that the poisoning was not accidental, but that there were some grounds for believing in suicide. It was finally resolved that the case should be sent before the Assize Court, and left to the jury to pronounce on the guilt or innocence of the parties. This resulted in the acquittal of both, Dr. Demme having to pay half the costs of the trial. As if to darken a picture already black enough, it was reported that Dr. Demme and Mademoiselle Flora Trümpi, daughter of Gaspard Trümpi, had committed suicide by drowning in the Lake of Geneva; but this was without foundation, and it is now stated that Dr. Demme and Mademoiselle Trümpi committed suicide by taking poison at the Hôtel d'Angleterre, Genoa.

Poisoning by Absorption.—A curious case of poisoning by absorption of tobacco through the skin was mentioned at a recent meeting of the Académie des Sciences by M. Cl. Barnard, who received the information from M. Namias. A smuggler had placed a quantity of unmanufactured tobacco next his skin, and the heat and perspiration produced by walking caused the absorption of the poisonous properties of the tobacco, the consequences of which were very serious.

Alleged Poisoning by Morphia.—It is stated in the Registrar-General's Report that "an infant, aged three weeks, was poisoned by a lozenge which contained the forty-eighth part of a grain of morphia."

BOOKS RECEIVED.

THE BOOK OF PERFUMES. By EUGENE RIMMEL. With above 250 Illustrations by BOURDELIN, THOMAS, etc. London: Chapman and Hall, 193, Piccadilly. To be had also of the Author, 96, Strand; 128, Regent Street; 24, Cornhill, London; 17, Boulevard des Italiens, Paris. 1865.

A COMPANION TO THE WEATHER-GLASS, designed to record, numerically and graphically, the natural phenomena presented by the Barometer, Thermometers, Rain-Gauge, Clouds, Wind, etc.; with a Calendar for the year 1865. By a METEOROLOGICAL STUDENT. London: Bemrose and Sons, 21, Paternoster Row. Edinburgh: John Menzies.

THE SPIRIT OF NURSING. By HARRY JONES, M.A. London: Robert Hardwicke, Piccadilly.

FOR AND AGAINST TOBACCO. By BENJAMIN WARD RICHARDSON, M.A., M.D. London: John Churchill and Sons, New Burlington Street.

ON FOOD AS A MEANS OF PREVENTION OF DISEASE. By ERASMUS WILSON, F.R.S. London: John Churchill and Sons.

THE IRRATIONALE OF SPEECH. By a MINUTE PHILOSOPHER. Reprinted from 'Fraser's Magazine.' London: Longman and Co.

DR. GUY'S CONTRIBUTIONS TO SANITARY SCIENCE.—1. The Case of the Journeymen Bakers. Third Edition. London: Henry Renshaw.

PHOTOGRAPHS (COLOURED FROM LIFE) OF THE DISEASES OF THE SKIN. By Alex. Balmanno Squire, M.B. Lond., etc. London: John Churchill and Sons. No. 1. The Photograph in the present Number is admirably executed, and is a most faithful delineation of the Disease it is intended to represent.

TO CORRESPONDENTS.

C. L. P. (Grantham).—*Ammoniated Solution of Quinine.* Vol. XIII. p. 344.

M. Deës wishes for "a recipe for a wash to revive faded pencil writing." We fear it would be rather difficult to restore that which has been mechanically removed.

O. P. S. (Atherton).—We are unable to give the information.

M. J. S. (Liverpool).—Apply by letter, giving name and address, to the Secretary, who will forward the necessary instructions. *M. J. S.* is thanked for his enclosure.

Inquirer (Kirwaun).—(1) Lindley's 'School Botany,' price 5*s.* 6*d.* (2) Fownes's 'Manual of Chemistry,' price 12*s.* 6*d.* (3) We do not know the work you refer to.

B. P. (Liverpool).—Fownes's 'Manual of Chemistry;' Bentley's 'Manual of Botany.'

H. W. (Worcester).—If our correspondent means *Unguentum Hydrargyri Mitius*, this was proposed by Mr. Donovan to be made by rubbing together lard and black oxide of mercury at the temperature of 350° Fahr., continuing the friction for two hours.

W. J. C. (Birmingham).—The Quinine in *Tinctura Quiniæ Composita* is said to be almost entirely dissolved when digested for seven days, but practically this is found not to be the case, and a small quantity of acid is generally added to render the solution complete.

"*Codex.*" (Birmingham).—Yes.

Several articles are postponed for want of space.

Instructions from Members and Associates respecting the transmission of the Journal before the 25th of the month, to ELIAS BREMRIDGE, Secretary, 17, Bloomsbury Square, W.C.

Advertisements (not later than the 23rd) to Messrs. CHURCHILL, New Burlington Street. Other communications to the Editors, 17, Bloomsbury Square.

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THE PHARMACEUTICAL SOCIETY AND CHEMISTS AND DRUGGISTS.

Two Bills for regulating the qualifications of Chemists and Druggists are now fairly launched in the House of Commons, and the present Session will probably witness the settlement of the question which has so long agitated the drug trade. Throughout the discussion which has been carried on we have always carefully endeavoured to avoid any angry expressions in this Journal, and have even abstained from contradicting many erroneous assertions which have been made regarding the Pharmaceutical Society, until members of that Society charged us almost with a dereliction of duty in neglecting to uphold its honour. We must confess that we have thought, and still think, that honour too well established to be really imperilled by the attacks to which it has been subjected; and we have thought, and still think, that those attacks, although put forth officially as coming from a Society which claims to represent a majority of our brothers in the trade, did not express the real feeling of those gentlemen. Now this suggests to us one of the first and greatest misstatements, viz. that the Pharmaceutical Society does not represent the drug trade, either in feeling or by its numerical strength. We were, perhaps, content to think our proportion small when it was the fashion to speak of the Chemists and Druggists as amounting to 35,000, but when the census returns of 1861 came forth to the public we found, by a fair computation, that our members, men really and truly in business on their own account, amounted to one-third of the Chemists and Druggists in business in England and Wales. The register of these men, with their addresses, is annually published; they must be members at the time of publishing, not gentlemen who may have been enrolled at some previous time and have been satisfied with one year's connection with the Society, and we should like to know whether any other association can produce such a register of actual subscribing members who are *de facto* Chemists and Druggists in business on their own account? The agents of the "United Society" seem to have slightly modified the reading of, "*He who is not with me is against me;*" preferring, as men often do, to apply great truths to their neighbours rather than themselves, and translating the passage, "He who is not with *you* is with *me*." We dissent from such a conclusion, and have ample evidence on our side in the recent memorials, which were sent to the Council, expressing approval of the Bill now introduced by Sir Fitzroy Kelly.

But does the Pharmaceutical Society represent the Chemists and Druggists in feeling? All sorts of flattering terms were used regarding its members two years ago. They were called the "*élite* of the trade." Sometimes we hear of the "upper ten thousand," and we can, perhaps, imagine that there may be ten thousand persons in this kingdom, or might have been when patricians and plebeians were more widely separated than they are now, so far removed from the ordinary cares of life as to be indifferent on many things nearly concerning the "people;" but it is beyond imagination that there can be an "*upper ten millions*" who can be indifferent to the common weal; and that would be about the proportion, as regards the population of Great Britain, that the Pharmaceutical Society bears to the whole chemists and druggists. Pharmaceutical Chemists are chemists and druggists like unto others in all that regards their interest in the trade; an interference with pharmacy by the Medical Council, or any other authority, would be as objectionable to them as to the smallest druggist who can fairly claim the title—perhaps more so,—and it is for that very reason that the Pharmaceutical Society has worked for the last quarter of a century, regardless of time, trouble, and treasure, to elevate the whole trade to such a position that its own members may be chosen, and claim to be chosen, to undertake the duties of such management as is declared to be necessary now. And if in doing all this the Pharmaceutical Society has gained the confidence of the Government, the higher branches of the medical profession, and the public, should it thereby forfeit, or has it forfeited, the goodwill of the men whom it has advanced? We assert fearlessly that the Pharmaceutical Society does more fully represent the "trade" than any other association. The very fact of the means provided by the trade for this work is a proof of it.

It concerns us to uphold the Council and Local Secretaries as well as the Society. We cannot avoid remarking on the gratuitous insult which was offered to both by one of the deputation from the United Society to Sir George Grey, who talked of the "*misrepresentations*" which had been used to obtain signatures to the recent memorials. Some correspondence from Walsall bearing on this subject will be found in another part of this Journal. He did not venture to describe the misrepresentations, but we do venture to describe his accusation as slanderous and untrue. The publication of the Bill, drawn by the Council of the Pharmaceutical Society, preceded the issuing of the memorials from Bloomsbury Square, and there was no representation made that any deviation from that Bill was contemplated. Chemists and Druggists, whether Pharmaceutical or not, were asked for an expression of approval, and they gave it, much more heartily we think than their *soi-disant* representatives expected or approved.

Sir George Grey was informed that Sir Fitzroy Kelly's Bill demanded "*that persons should have a knowledge of Latin, Botany, Materia Medica, Pharmacy, and Chemistry*," but that Sir John Shelley's Bill only required an examination as to "*the nature and doses of medicines*," and an ability "*to read prescriptions with ease and accuracy*." The former must certainly be the science of Materia Medica, with some Pharmacy and Chemistry, if not Botany; and the latter, we think, necessitates an acquaintance with the language in which prescriptions are written. Wherein, then, lies the great difference which makes one examination oppressive, and the other altogether acceptable? Perhaps in the presumption that the United Society, which was formed without any reference to education, may be expected to make their examinations so complete a farce that they will afford neither safety to the public nor honour to the examined.

The Pharmaceutical Society is next charged with a desire to arrogate for its members a superiority which only exists in name. If the gentleman who said this will take the trouble to read the Bill, he will find the Pharmaceutical Society is bound to give the same trading titles to all who shall pass its examinations, whether connected with it or not; and the enactment of Sir John Shelley's Bill would no more abolish the distinction between "Pharmaceutical Chemists" and "Chemists and Druggists" than does Sir Fitzroy Kelly's.

If anything can perpetuate a division—or, if no division exist, create one—

in our trade, it must surely be the establishment of an upper and lower Board of Examiners. A multiplication of grades of persons examined by one Board is common throughout the professions of Law, Physic, and Divinity, and creates no jealousy. M.D., M.B., F.R.C.S., and M.R.C.S. are all honourable distinctions; but when we find by the 'Medical Directory' that Dr. Dash went to the world's end to take a degree which might have been granted to him of better quality at home, we begin to institute comparisons.

Lastly, is Sir Fitzroy Kelly's Bill oppressive to the men at present constituting the "trade"?

It proposes to place them on a register for as moderate a fee as may be, and has not an atom of future authority over them. Their present rights and privileges will be effectually preserved by this registration. The Pharmaceutical Society would gladly welcome them into its ranks as members, and the way in is neither difficult nor degrading.

THE TWO BILLS FOR REGULATING THE QUALIFICATIONS OF CHEMISTS AND DRUGGISTS.

We have inserted elsewhere two Bills which are now before Parliament, both of which bear the same title, namely, "A Bill to regulate the Qualifications of Chemists and Druggists," and each of which, if enacted, is to be styled, "The Chemists and Druggists Act." The Bill No. 1 was introduced by Sir Fitzroy Kelly on the 17th of March. It is substantially the Bill of the Pharmaceutical Society, and is strictly an educational measure. It provides for the registration of all existing chemists and druggists, and assistants to chemists and druggists, in addition to Pharmaceutical Chemists who are already registered, and it secures to these the rights and privileges they at present possess. It provides that registered Chemists and Druggists shall be eligible to be elected Associates of the Pharmaceutical Society, but that those who in future enter the business shall be so elected only after passing the Minor Examination. It provides that Associates as well as Members of the Pharmaceutical Society shall have the privilege of attending all meetings of the Society, of voting thereat, and otherwise of taking part in the proceedings of such meetings, but that Associates shall not otherwise have or exercise the rights or privileges which now are or may be possessed by members of the Society. It provides that any person keeping open shop for the sale or compounding of drugs by retail, who shall use the name or title of Pharmaceutical Chemist, or Chemist and Druggist, or Chemist or Druggist, etc., without being registered as such, shall be subject to a penalty. And lastly, it provides that no person, unless he be registered under this Act, shall keep open shop for *compounding the prescriptions of duly qualified medical practitioners*, and it imposes a penalty of five pounds upon those who infringe this provision.

It will thus be seen that the objects of this Bill, the Chemists and Druggists Bill No. 1, of which Sir Fitzroy Kelly has charge, are to establish a register of all those who at present have a vested interest in the business of a Chemist and Druggist, and to require from all who in future use any of the titles specified, that they shall pass an examination and prove their qualification. It leaves the mere sale of drugs and simple medicines unrestricted as at present, so that the little village shopkeeper may supply salts and senna, and brimstone and cream of tartar as hitherto, provided he does not assume a title indicating that he is qualified for the higher duties of pharmacy. The dispensing of physicians' prescriptions is considered to be a higher duty, requiring a qualification that ought to be tested by examination, and no one will therefore be allowed, in future, to enter upon this duty without a certificate of qualification.

A register of qualified medical practitioners has already been established, so that the public may be able to distinguish between the regularly educated and examined man, and the mere pretender.

The Bill of Sir Fitzroy Kelly aims at the establishment of a similar register of qualified dispensers, to whom the responsible duty of acting as agents between physicians and their patients may be safely entrusted. The legally qualified medical practitioner would thus have some guarantee for the exercise of the knowledge and skill required for carrying out his instructions, and the public would be protected against accidents arising from ignorance.

There are some points connected with the sale of dangerous drugs which would be left for subsequent legislation, but the provisions of this Bill would greatly facilitate the attainment of what is required in that direction.

The Chemists and Druggists Bill No. 2, which has been introduced by Sir John Shelley, is a far more sweeping measure than the one to which we have just alluded. It emanates from the United Society of Chemists and Druggists; but as this body has been but imperfectly organized, and is wholly deficient in the arrangements for conducting examinations and otherwise realizing objects which are contemplated by the Bill, it would be necessary to create a corporate body for that purpose. There was the Pharmaceutical Society, it is true, with all the mechanism that was required, in full, active, and vigorous operation, but of course it would not have answered the purpose of the originators of the measure to seek assistance in that quarter; so they propose the appointment by the Government, of a Lord High Commissioner with power to summon all the Chemists and Druggists in England and Wales by public advertisement, and those answering to the summons, without any further question, are to be *assumed* to be the Chemists and Druggists of England and Wales,—just as the individuals of all ages, both sexes, and various occupations, including Crosse and Blackwell the picklemongers, Bowerbank the distiller, Bowles the printer, Howlett the cabinetmaker, Rimmel the perfumer, Rowland's Macassar Oil, Brett's Brandy, Harper Twelvetrees's Washing Powder, Lady Clifton, Mrs. D'Aubney, Miss Tottenham, etc., have been similarly represented, to swell out a list of members by the Society from which the proposition emanates. These assembled so-called Chemists are to elect a President and Vice-President, and a Council of twenty-one Members,—the Commissioner, however, with the Secretary of State, having the power, if they are dissatisfied with the proceedings, of annulling them and ordering a new election, and of repeating this for an unlimited number of times—a very necessary provision under the circumstances. Then the body thus incorporated, which would be distinct from, and wholly unconnected with the Pharmaceutical Society, would have to appoint a Registrar and have a Register made of all Chemists and Druggists not connected with the Pharmaceutical Society, over which body they would have no control whatever. There would thus be two Societies having similar objects, and two separate registers prepared by different registrars and kept in different places, but both containing the names of men engaged in the same occupation, although assuming different titles. There would be the Register of Pharmaceutical Chemists, kept by the Registrar of the Pharmaceutical Society, already comprising the names of more than one-third of all the Chemists and Druggists in England and Wales, and representing probably two-thirds of the legitimate pharmaceutical business of the country. And then there would be the Register of Chemists and Druggists,—of the men who have hitherto held themselves aloof from those of their brethren who, for a long series of years, have been carrying out successfully the principles which are now so tardily and reluctantly acknowledged by this section of the trade. This register of Chemists and Druggists would comprise those not belonging to the Pharmaceutical Society, and as it would be unnecessary for any man to have his name on more than one register, and it would be optional with every one which examination he underwent, there would of course be a competition between the two Societies as to which should get the greater number of names.

As far as registration is concerned, the difference between the two Bills is, that Bill No. 1 provides for a mere extension of a system already in existence, which would be carried out by existing arrangements, without any new mechanism, and would then supply a complete and undivided register, easy of reference, and available for all required purposes; whereas Bill No. 2 contemplates the organization of a new mechanism, which would have to be created at great cost, by a cumbrous arrangement, for the purpose of producing a register, which would necessarily be imperfect and would very inadequately fulfil the required object.

There can surely be no question between the relative advantages of these two methods of effecting registration.

But Bill No. 2, as well as Bill No. 1, contemplates something more than registration. It provides for the examination of those who hereafter shall become chemists and druggists; but this part of the Bill is extremely loose, crude, and imperfect. Clause 13 gives to the Council the power of appointing examiners in such parts of England and Wales as they shall think fit, and of making rules and regulations for conducting the examination of persons applying to be registered as chemists and druggists as to their knowledge of the nature of drugs and medicines in general use, with their doses. It does not appear that these rules and regulations are to be of the nature of by-laws requiring the confirmation of the Secretary of State; but, on the contrary, the object appears to be to leave the subject to the uncontrolled discretion of the Council, with a very vague indication of what sort of an examination is intended. It may be inferred, indeed, from its being stated that the examination is to be on *the nature of drugs and medicines in general use, with their doses*, that it is not intended to include a knowledge of Latin, even such a knowledge as is required for reading prescriptions, but merely a general smattering about the *nature of drugs* and their doses, such as most apprentices, without much study, would be likely to possess. If this is what is meant by "regulating the qualifications of chemists and druggists," we have no hesitation in saying that such "regulation" would be worse than useless; it would be a mere sham and delusion, tending, not to the advancement of pharmacy and the elevation of those engaged in its practice, but rather to the discouragement of the efforts which have been so successfully made in that direction for many years past by the Pharmaceutical Society. If one part of the Bill more than another was required to be clearly defined, and made subject to the control of some higher authority than that of a Council elected by a sort of universal suffrage, it was that which defines the nature and regulations of the proposed examinations.

But even if the proposed examinations were satisfactory, the existence of two examining boards, such as there would be for the examination of chemists and druggists if Bill No. 2 were enacted, would be subject to grave objection. The board of examiners under the Pharmacy Act, and the separate board under the Chemists and Druggists Act No. 2, would both have the same ostensible object of testing the qualification of chemists and druggists. There would necessarily be a tendency to competition between two such boards, and there might be some underbidding with a view to business, which would not contribute to the accomplishment in the most satisfactory manner of the objects for which such examinations are established. This objection was successfully urged against the Bill introduced some years ago by Lord Derby, and we believe it especially applies to one of the Bills now before Parliament.

In Bill No. 2, registration and examination are made the basis of a proposition for restricting the sale of drugs, such as cannot be expected to be received with much favour by a legislature recognizing the principles of free trade. The dealers in drugs in England and Wales, or rather a section of them,—the very men who up to the present time had refused to assist in the efforts which have been made by their brethren to improve the qualification of those engaged in the business,—now modestly ask that they should be allowed to "regulate the qualification of chemists and druggists," and for this purpose they propose that the sale of drugs should be limited to themselves and those whom they may choose to license for the purpose. They propose to elect a Council and appoint a board of examiners, with a very elastic programme of examination, and then they will not allow any one to sell a pound of sulphur or an ounce of cream of tartar without a license from their board or from ours. *We* wish for no such restriction, because we consider it to be unnecessary, unreasonable, and unjust. It is a method of regulating the trade in drugs which we think the Legislature will be slow to sanction.

Pharmaceutical Chemists, it appears, would be allowed by the framers of this Bill No. 2, to *sell* drugs without the necessity of being examined by the Chemists and Druggists' Board,—a most considerate and liberal concession certainly, especially when taken in connection with clause 16, by which they are deprived of the power of recovering debts that may be due to them for such sales, unless they be registered under the Chemists and Druggists Act.

It would be easy to demonstrate in other respects the unreasonableness and impracticability of this measure, but we cannot think it is necessary to occupy any more space in doing so, feeling assured that what we have said will sufficiently show the great superiority of Bill No. 1 over No. 2. The one is a safe, moderate, consistent, most liberal, and, as we believe, perfectly efficient measure,—a measure that would contribute to the safety of the public without infringing any rights, interfering with any vested interests, or violating the recognized principles of legislation in this country; while the other is a measure of stringent restrictions which are directly opposed to free-trade principles, an attempt at the usurpation of power by a body who are not entitled to its exercise in the manner proposed, and a crude and undigested mass of inconsistencies, which, if carried into law, would disgrace the statute book.

THE TWO SOCIETIES, FROM WHICH THE BILLS FOR REGULATING THE QUALIFICATIONS OF CHEMISTS AND DRUGGISTS HAVE EMANATED.

The two Bills now before Parliament for regulating the qualifications of Chemists and Druggists have emanated from, and are promoted by, two independent associations or Societies, both of which claim to represent in this matter the prevailing opinion of the members of the trade to which the Bills relate. Statements have been made with reference to this point, by persons representing each of these Societies, which statements are greatly at variance with each other, and some of which are calculated to convey a very erroneous impression of the real facts of the case. The Government and the Legislature are very naturally desirous of knowing the feelings of those who would be most directly and materially affected by the proposed alteration of the law. They expect in such cases to have application made to them in the shape of solicitation or remonstrance, by deputation, petition or otherwise, and the value attached to such communications is influenced in a great measure by the number, position, and character of those by whom they are made.

The Chemists and Druggists Bill No. 1 is the result of long and mature deliberation of the Council and Members of the Pharmaceutical Society, by whom it is recommended for support to the body of Chemists and Druggists throughout the country. A deputation from this Society having appealed to the Secretary of State in favour of the measure, was asked for some tangible indication of the general feeling of the trade with reference to it, and they accordingly applied through their Local Secretaries to all the Chemists and Druggists in the principal towns for a declaration in favour of this Bill, which was responded to with a remarkable amount of unanimity. In most of the great centres of commerce and intelligence, not only a real but an overwhelming majority of Chemists and Druggists of every grade willingly signed the declaration, and in a great many instances every individual joined in this expression of approbation. The result of this application was communicated to Sir George Grey, and, founded upon it, the representatives of this Society claimed for themselves the character in this matter of representatives of the trade.

But, meanwhile, the Chemists and Druggists Bill No. 2 was being produced as a rival measure emanating from a rival Society, "The United Society of Chemists and Druggists," who appear to claim that they represent all the Chemists and Druggists not belonging to the Pharmaceutical Society. This Bill No. 2, although aiming at similar objects to those contemplated by Bill No. 1, proposes to carry them out in a different way, as we have explained in the preceding article. Its promoters having personal interest in the result have made strenuous efforts to promote their own object by throwing discredit, not only upon the means resorted to, but upon the very character and position of their competitors. Some of the statements that have been thus made we have alluded to elsewhere; those we wish now to deal with relate to the relative numerical strength, position, and character of the two Societies.

It has been stated, and positively asserted over and over again, that not only does the United Society more fully and really represent the body of Chemists and Druggists than the Pharmaceutical Society does, but that it also comprises a larger number of members, and therefore that its position and character are such as to claim at least equal consideration, while its influence is far greater than that of the Pharmaceutical Society.

We most strongly deny the truth of these statements, and will endeavour to show, by an appeal to undoubted facts, that there is no more reliance to be placed in them than in the assertions which emanated from the same quarter a few years ago with reference to the total number of Chemists and Druggists in England and Wales. It will be recollected how contemptuously the representatives of the United Society used to speak of the Pharmaceutical Society as a very small section of the Chemists and Druggists, whom they represented as numbering about 40,000; and, assigning 2000 to the Pharmaceutical Society, they assumed that *they* represented the remaining 38,000. The hollowness of this vain boasting was only equalled by its folly, for, having used it as an argument in support of their claim for exemption from serving on juries, it was turned against them as affording sufficient ground for rejecting the claim. Having been positively asserted, however, it was for a time received as a truthful statement, even by the Government, until we were enabled, by a reference to the undoubted evidence afforded by the census returns, to dissipate so absurd a delusion or misrepresentation. We have shown that the number of Chemists and Druggists of all sorts in business on their own account in England and Wales is less than 6000, of whom more than 2000 are members of the Pharmaceutical Society. But we are told—and this statement was made by the deputation who waited on Sir George Grey—that the United Society are a larger body than the Pharmaceutical Society. Now, let us see what evidence there is in support of this assertion.

In estimating the relative importance and influence of the two Societies, it is necessary to look in either case to something more than a mere array of names purporting to represent the numerical strength of the body. Who are the individuals whose names are used to swell a list, and give the appearance of strength to a Society? What are the circumstances under which these names have been obtained? What grounds are there for calling them members of the Society? What are the conditions of membership, and how far have these conditions been fulfilled? If these questions be asked and truthfully answered with reference to the respective lists of the Pharmaceutical Society and of the United Society of Chemists and Druggists, something like a just estimate may be formed of the relative importance and influence of these two bodies.

The Pharmaceutical Society was founded in 1841; it has been in existence, therefore, for nearly a quarter of a century, during which period its ostensible objects and aim have been to advance and elevate the study and practice of Chemistry and Pharmacy, to promote a uniform and efficient system of education among those who practise Pharmacy, to protect the interests of Chemists and Druggists, and to provide a fund for the relief of the distressed Members and Associates of the Society, and their widows and orphans. These objects have been steadily and successfully carried into effect in every particular. No pains or expense have been spared in providing for and promoting an improved system of professional education for the rising generation of Chemists and Druggists, nor has anything been done in the same direction by any other body. Means have also been provided for those of all ages, whose occupations would not admit of their otherwise extending their acquaintance with Chemistry and Pharmacy, whereby they might keep pace with the progress of improvement. Valuable assistance has been rendered on numerous occasions, not only to the body of Chemists and Druggists, but to individuals, and even to those unconnected with the Society, when the interests of the trade have been unjustly assailed from any quarter. And lastly, the members, by their individual and united efforts, have created a fund for the relief of distressed members, of which fund there is now an available surplus of more than £7000.

The men who united their means and applied their energies for the carrying out of these objects, comprised all the leading members of the drug trade, both wholesale and retail, in town and country. Many of these men may now be spoken of as belonging to a past generation, including the venerable William Allen, the first President of the Society, and Charles James Payne, the second President, and John Barry, and Richard Battley, and John Bell, and Jacob Bell, and Joseph Gifford, and Thomas Herring, and William Hudson, and William Ince, and Richard Hotham Pigeon,—all of whom were men of mark, some of them ranking among the great benefactors of their race; and these, with many hundreds more of similar position, who are still active members, were among the founders of the Society. Around them were gathered in association about sixteen hundred druggists, men engaged in business throughout the country, and a still larger number of assistants and apprentices, making altogether about four thousand individuals, who for several years subscribed—the members two guineas, and the assistants one guinea each, per annum—for the establishment and support of the Society. The result has been the formation of a great institution which ranks now among the best appointed and most efficient of the institutions of a similar description not only in this metropolis, but in the world. Here are extensive museums and library, and laboratories, and examination and lecture arrangements, all in full and active and efficient operation, contributing to stimulate those who are either practising or preparing to practise pharmacy, to the acquirement of the knowledge by which alone they can become qualified for their occupation, and not only stimulating them, but also helping them to its acquirement. No other society but the Pharmaceutical Society has contributed to this result, or has independently undertaken anything of the same sort, and, had it not been for the work thus done, the Chemists and Druggists of Great Britain would have remained to the present day what they were before 1841, a disunited body, calling themselves Chemists and Druggists, but having little or no knowledge of chemistry, and a very inadequate knowledge of drugs, and of the means by which they should be prepared for use in medicine. The association of good and earnest men who commenced the good work in 1841, and who in 1843 numbered sixteen hundred members, besides associates and apprentices, continued at about this number until in 1852 the Pharmacy Act was passed. At that time one of the conditions to membership involved the passing of an examination, which limited the number joining the Society, but helped to raise the character of the association, by making professional qualification the basis of membership.

While the Pharmacy Act of 1852 was before the Legislature, the value of the services which had been rendered by the Pharmaceutical Society was fully acknowledged, and to this Society was entrusted the carrying out of the provisions of that Act, the Members of the Society being made the basis of the privileged body of Pharmaceutical Chemists. The members, however, instead of keeping the conferred privilege to themselves, and admitting only by examination, the way by which alone they were compelled to admit others to a participation with them, threw the door open and said, "Come, you of our brethren who have like standing with ourselves in the business, enter now freely and partake with us of what the Legislature offers, and with it partake also of all the benefits of our institution." Many hundreds of Chemists and Druggists responded to this invitation, and consequently in 1853 the number of subscribing members of the Society rose to 2455, which is the largest number there has been in any year. Since that time no one has been admitted without examination, and through the influence of the Society thus exerted a large number of well-educated and fully qualified men have been added to those engaged in the practice of pharmacy throughout the country. It is true that the number above stated has not been fully kept up since 1853, as the admissions by examination every year have not quite equalled the losses from death and various other causes; but the defalcation may principally be ascribed, we believe, to the fact that the Society contained most of the best men in the trade at the time of the passing of the Pharmacy Act, and that many of those who then entered the Society, on the door being freely opened, were in their hearts, or from their limited means, but lukewarm or constrained supporters of the recognized principles of the Society. With such members the necessity of paying an annual subscription outweighed their zeal in the cause, and they gradually dropped off. But although after the spirt which took place in 1853, there was an annual falling off for several years, yet such has not latterly been the case, and the Society is now numerically as well as financially, in a more healthy, vigorous, and prosperous condition than it has ever been in since the early days of its formation. It still contains the zealous and united men who have laboured so long and so successfully in carrying out its objects; it comprises nearly all the men of prominent position and of greatest influence in the trade, and although from peculiarities of temperament or some other cause, there are a few who have held aloof and refused to join the association, which must almost necessarily be the case with a voluntary society, yet the Pharmaceutical Society certainly does represent the intelligence and the moral and professional influence, as well as the bulk of the legitimate business of the drug trade.

And now, having looked at this picture, let us look at the other.

The United Society of Chemists and Druggists was commenced in 1861, and in the First Annual Report, dated February 27, 1862, the objects of the Society are thus explained:—

"The Society is based upon the principle of co-operation, as essential to the strength and progress of Chemists and Druggists as a trading community, with the following objects:—

"1st. The establishment of a Benevolent Fund for the assistance of Members in sickness, destitution, and death.

"2nd. To carry out, by district meetings and combined action, any improvement that may be deemed necessary for the welfare of the Trade.

"3rd. To promote early and Sunday closing.

"4th. To watch the progress of, and support or oppose, any legislative enactment that may affect the interests of Chemists and Druggists as a trading community.

"5th. To answer any legal questions relating to the trade rights of Members, free of cost.

"6th. To keep a Register of the Transfer of Businesses, required Partnerships, and Situations for Assistants, etc., and to be the general recipient and exponent of any other Trade requirement."

The Committee in this Report state that, "to place the Society upon a broad numerical basis was their immediate object; and to enable them to do so successfully, they determined that the admission fee should be within the means of *the poorest member of the trade.*" They accordingly fixed the members' subscription at 5*s.* a year, and with this small payment as the only condition to membership they endeavoured to extend the Society, *upon the broad numerical basis* alluded to. At the end of the first year's operations, the Committee announced the receipt of subscriptions amounting to £218. 14*s.* 6*d.*, which would represent 875 members at 5*s.* each; but it seems very doubtful from the statement published, which, like everything else emanating from the same source, is vague and unsatisfactory in the extreme, whether this amount does not comprise donations to the Benevolent Fund. Assuming, however, that the £218 represents the subscriptions of Members, it is obvious that these were not *bonâ fide* Chemists and Druggists, but any persons who could be induced to subscribe for the objects stated. Not only Chemists, but their shopmen and apprentices were actively canvassed all over the country, and besides those in any way employed in the drug trade, tradesmen employed by druggists, but not themselves connected with the trade, were often induced to give something to the concern and forthwith were dubbed Members. In the second year's report, after much touting through the country, the amount reported to have been received in *subscriptions, donations,* and *members' fees,* was altogether £430. 17*s.* 10*d.* This was the amount received in 1862, and reported at the annual meeting held in 1863. A large proportion of this was paid to the Benevolent Fund, and the greater part of it, as far as one can judge from a very obscure statement of accounts, was subscribed for that special object, and much of it either by wholesale Druggists, or by persons having no claim to the title of Chemist and Druggist,—such as Western Wood, Esq., M.P.; William Edwards, Esq., St. Paul's Churchyard, dealer in patent medicines; Francis Newbery and Sons, dealers in patent medicines; Thomas Holloway, Esq., Temple Bar, quack doctor; Beaufoy and Co., vinegar makers; Bowerbank and Sons, distillers; Crosse and Blackwell, Italian warehousemen, etc. If we take half the sum announced as representing the subscriptions of members or members' fees, we shall still have about the same number of eight or nine hundred as the outside of the numerical strength of the Society, made up of all sorts of persons. The last Report was presented in 1864, and it represents the "*subscriptions, donations, and members' fees,—town and country,*" to have been £447. 14*s.* 2*d.* In this case again we are left in doubt, as before, as to how much consisted of subscriptions and how much of donations. If we were to deduct from it all that is specially reported as donations, there would be very little left for subscriptions. It is quite obvious that it was not all subscriptions, and most probably much less than half of it was such, so that we are still left with about the same, or at any rate not a larger number of subscribing members, if we calculate them from this datum. The real fact of the matter is, that although the agents of the Society have been most active in hunting over the country for recruits, enlisting them on any terms, the only condition to membership being a payment of 5*s.*, with the prospect of relief from the Benevolent Fund held out as an inducement to subscribe or give some small donation, yet the largest amount collected in any year has been considerably under £500. If, as the representatives of the Society say, they are a more numerous and influential body than the Pharmaceutical Society, let us know who and what they are? What are their principles, and how have they justified them? What are the conditions of membership, and how far have these conditions been fulfilled?

The Society have an office and a paid agent, who is most active in his vocation, and is very badly paid out of the two or three hundred a year he is able to collect in subscriptions; they have also a list of names which they are very fond of talking about, but do not like to show, and beyond this they have absolutely nothing to refer to, either in work done or preparation for work to be done. Even their tardy recognition of the importance of making professional qualification the basis of pharmaceutical legislation was not spontaneous, but was adopted from expediency, as will be seen from the following resolutions passed by the Manchester Committee in October, 1862:—

1. "This Meeting regrets that the praiseworthy exertions made by the Executive Committee of the United Society of Chemists and Druggists, to get the clause exempting members of the trade from serving on juries, were not crowned with success."

2. "That in the opinion of this Committee, the principal cause of failure arose from the difficulty of defining, to the satisfaction of Her Majesty's Government, the qualifications of a Chemist and Druggist."

3. "That to obviate this difficulty, it is desirable some qualification should be named, upon which future legislation may be based; and this Committee, in correspondence with the Central Committee, pledges itself earnestly to consider this subject before the next meeting of Parliament."

This was the origin of the Chemists and Druggists' Bill No. 2, and it will serve to explain the objects for which it has been introduced. It has, no doubt, enabled them to add to their list of members, but we deny that even at the present time they have anything like 2000 *bonâ fide* Chemists and Druggists on their list.

If they have 3000 members paying an annual subscription of five shillings, we ask what has been done with the proceeds of these subscriptions; for, although each item is but a paltry pittance, the aggregate amount ought to be somewhere. It is not sufficient that they publish an array of names with little or no means of identifying the individuals, and nothing to show what has been done, and when it was done, to justify the appearance of such names in the list. We have tried to analyse this list, but find it a hopeless task to do so to more than a small extent. We can discover, however, that it is not a list of *bonâ fide* Chemists and Druggists, but contains the names of persons of all ages, both sexes, and various occupations, including printers, soapmakers, ironmongers, cabinet-makers, perfumers, Italian warehousemen, quack doctors, distillers, vinegar-makers, solicitors, etc. etc.; and, besides these, as if to justify more fully the character of its authors for powers of mystification, there are a certain number of anonymous entries, such as G. F. (B. F.); a Friend, etc. There are, it is true, the names of a few respectable Chemists in the list, some of whom are as much surprised to find their names there as we have been to see them, and they say they have done nothing more to justify it than having at some former period given a small donation to the agent to appease his solicitations; but in this case, as in that of the Church, "once a parson always a parson;" and thus, after a lapse of years, by dint of much touting, the list may be swelled up to a respectable length. We may apply to it the definition of the Chancellor of the Exchequer for the word deputation—"A noun of multitude signifying many, but not signifying much."

Until the present time we have avoided making any direct allusion to the United Society or their proceedings. There are among them those whom we recognize as brethren, and for whom we feel the respect due to fellow-workers in the same cause and occupation, with many feelings and interests in common. We regret to find ourselves in a position antagonistic to such, and especially to find that their names are used to give the semblance of respectability to a list that cannot be otherwise viewed by those who are acquainted with the facts of the case than as a most unreal representation of even a section of the *bonâ fide* Chemists and Druggists of this country. We should have been glad to have been spared the duty of referring to this subject, but the present circumstances of the case demand that we should state the truth and the whole truth, as far as we know it.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *March 1st*, 1865,

Present—Messrs. Bird, Bottle, Davenport, George Edwards, Evans, Hanbury, Haselden, Hills, Mackay, Morson, Orridge, Reynolds, Sandford, Squire, and Waugh,— The following Pharmaceutical Chemists were elected

MEMBERS.

Colby, John ....Brighton.
Harvey, Sidney ....Canterbury.
Currie, John ....Glasgow.
Tugwell, William Henry ....Greenwich.
Bingley, John ....Northampton.
Whiteway, William Henry ....Torquay.
Sells, Robert James ....Tunbridge Wells.
Francis, John...Wrexham.

The following having paid their arrears were restored to Membership:—

King, Robert ....London.
Watts, Henry...Chatham.
Watts, Henry Thomas ....Manchester.

EXAMINATION, *March 15th*, 1865.

MAJOR (Registered as a Pharmaceutical Chemist).

Balch, Edwin...Bideford.

MINOR (Registered as Assistants).

Bateman, Thomas Henry ....Salisbury.
Brough, Henry James ....Windsor.
Clayton, Francis Corder ....Leeds.
Harris, Henry William............................Reading.
Rayner, Gilmour George ....Swansea.
Richardson, Joseph Hancock ....Plymouth.
Thomas, John Ashlin ....Harrogate.

REGISTERED APPRENTICES.

Name.	Residing with	Address.
Chantry, George	Mr. Chantry	Goole.
Ellinor, George	Mr. Knight	Bath.
Fripp, Percival Kossuth	Mr. Pollock	London.
Hughes, Henry Martyn	Mr. Thomas	Newcastle Emlyn.
Preston, Alfred	Mr. Smith	Abingdon.
Rickett, Arthur	Mr. Cornish	Brighton.
Walker, William Mott	Mr. Munday	Worthing.
Wright, Wm. Thompson	Messrs. Wright, Francis, & Co.	London.

Erratum: page 396, line 1, for "Rees, Thomas," read "Thomas, Rees."

FINANCIAL STATEMENT.—*From 1st January to 31st December*, 1864.

Receipts.		£. s. d.
Balance in Treasurer's hands		443 6 11
Benevolent Fund:		
Subscriptions	166 15 0	
Interest	180 13 11	
		347 8 11
Life Members' Fund:		
Fees	78 15 0	
Interest	70 10 1	
		149 5 1
Government Securities:		
Interest		29 3 9
Rent		83 10 0
Arrears of Subscription		186 7 6
Donation to the Society		1 1 0
Subscriptions:		
352 London Members	369 12 0	
1418 Country Members	1488 18 0	
104 Associates	54 12 0	
113 Apprentices	59 6 6	
		1972 8 6
Fees:		
65 Pharmaceutical Chemists	470 8 0	
58 Assistants	243 12 0	
103 Apprentices	216 6 0	
38 Registration Certificates	1 18 0	
		932 4 0
Fees:		
Lecture		152 15 6
Laboratory		424 8 0
Balance due to Secretary		2 11 6
		£4724 10 8

Expenditure.		£. s. d.
Benevolent Fund:		
Relief granted	£115 0 0	
Investment	232 8 11	
		347 8 11
Life Members' Fund:		
Investment		78 15 0
Government Securities' Investment	564 19 5	500 0 0
Conversazione	67 6 4	
Gratuity to Redwood, jun.	5 5 0	
Pharmaceutical Meetings	13 11 2½	
Repayments	2 2 0	
Sundries	13 13 0	
		101 17 6½
House Expenses		41 5 5
Rent, Rates, Taxes, and Insurance		446 14 7
Repairs and Alterations		28 19 1
Fixtures and Fittings		50 10 3
Apparatus		18 2 8
Library		47 10 5
Museum		0 12 10
Furniture		14 9 9
Stationery		16 7 8½
Postage		56 1 1
Printing and Engraving		95 5 3
Advertisements		23 4 0
Journals: Balance of Account		47 8 9
Carriage		2 2 8
Collector's Commission		31 4 0
Travelling Expenses		137 18 11
Secretary and Registrar's Salary		300 0 0
Gratuity to Secretary and Registrar		21 0 0
Wages		166 1 0
Expenses of Society in Scotland		61 11 0
Board of Examiners		120 15 0
Professor of Chemistry and Pharmacy, including duties as Curator, etc.		300 0 0
Professor of Botany and Materia Medica, including duties as Curator, etc.		250 0 0
Special Lectures		18 12 0
Subscription to Royal Botanic Gardens		21 0 0
Prize Medals, etc.		6 1 6
Laboratory:		
Director's Salary and Percentage on Fees	293 14 3	
Demonstrator	100 0 0	
Porter's Wages	53 0 0	
Chemicals, etc.	106 11 2	
		553 5 5
Repayment to Secretary		5 5 1
Balance in Treasurer's hands		815 0 10
		£4724 10 8

We, the undersigned Auditors, have examined the Accounts of the Pharmaceutical Society, and find them correct agreeably with the foregoing statement, and that, as shown by the Books of the Society, there was standing in the names of the Trustees of the Society, at the Bank of England, on the 31st of December, 1864:—

On Account of the General Fund, New 3 per Cents	£1564 19 5
Life Members' Fund, 3 per Cent. Consols	2563 11 11
Benevolent Fund, 3 per Cent. Consols	6440 5 4
Bell Memorial Fund, 3 per Cent. Consols	2050 0 0

Frederick Barron,
James Burgoyne,
Michael Carteighe,
James Crispe,
John Garle.
Auditors.

February 21, 1865.

BOTANICAL PRIZE FOR 1866.

A Silver Council Medal is offered for the best Herbarium, collected in any part of the United Kingdom between the first day of May, 1865, and the first day of June, 1866; and should there be more than one collection possessing such an amount of merit as to entitle the collector to reward, a second prize, consisting of a Bronze Medal, and also Certificates of Merit, will be given at the discretion of the Council. In the event of none of the collections possessing such an amount of merit as to warrant the Council in awarding Medals or Certificates, none will be given.

The collections to consist of Phanerogamous plants and Ferns, arranged according to the Natural System of De Candolle, or any other natural method in common use, and to be accompanied by lists, arranged according to the same method, with the species numbered.

The collector to follow some work on British Botany (such as that of Babington, or Hooker and Arnott), and to state the work which he adopts. The name of each plant, its habitat, and the date of collection, to be stated on the paper on which it is preserved.

Each collection to be accompanied by a note, containing a declaration, signed by the collector, and certified by his employer, or a pharmaceutical chemist to whom the collector is known, to the following effect:—The plants which accompany this note were collected by myself, between the first day of May, 1865, and the first day of June, 1866, and were named and arranged without any assistance but that derived from books.

In estimating the merits of the collections, not only will the number of species be taken into account, but also their rarity or otherwise, and the manner in which they are preserved, and should a specimen be wrongly named, this will be erased from the list.

The collections to be forwarded to the Secretary of the Society, 17, Bloomsbury Square, on or before the first day of July, 1866, indorsed "Herbarium for Competition for the Botanical Prizes." After the announcement of the award, they will be retained one month, under the care of the Curator of the Museum, for the inspection of persons connected with the Society, and then returned to the collectors, if required.

No candidate will be allowed to compete unless he be an Associate, Registered Apprentice, or a Student of the Society, or if his age exceed twenty-one years.

FREE ADMISSIONS TO THE ROYAL BOTANIC SOCIETY'S GARDENS, REGENT'S PARK.

The following pupils of the Class of Materia Medica and Botany, in the Pharmaceutical Society, after examination in the Elements of Structural and Physiological Botany, were recommended by Professor Bentley to Mr. Sowerby, the Secretary of the Royal Botanic Society, for free admission to the Gardens in the Regent's Park, and the privilege was at once liberally accorded to them:—

T. H. Bateman,	F. Oldfield,
H. J. Brough,	M. H. Payne,
F. C. Clayton,	A. Rose,
W. T. Fincham,	W. G. Selfe,
C. Gorton,	T. F. Shephard,
H. W. Harris,	A. Smith,
W. Heale,	J. A. Thomas,
A. W. Hitchcock,	A. Towerzey.

The above are arranged alphabetically, and without any reference to actual merit exhibited at the examination.

These orders will admit the above students to the gardens upon ordinary days in the months of March, April, and August, from nine A.M. till one P.M.; and in May, June, and July, from seven A.M. till one P.M. Such orders, therefore, give every facility to those who possess them of making themselves practically acquainted with plants.

PHARMACEUTICAL MEETING,

Wednesday, March 8th, 1865.

MR. T. H. HILLS, VICE-PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting having been read, the following

DONATIONS TO THE LIBRARY AND MUSEUM

were announced, and the thanks of the meeting given to the respective donors thereof:—

The Chemical News.
The Chemist and Druggist.
The Technologist.
The Photographic Journal.
The Medical Circular.
The Dental Review.
The British Journal of Dental Science.
The Journal of the Chemical Society.
The Proceedings of the Linnean Society.
The Educational Times.
The Veterinarian.
Bulletin de la Société Chimique de Paris. From the respective Editors.
Proceedings of the British Pharmaceutical Conference. Bath Meeting, 1864. From the Conference.
Des Quinquinas. Par Dr. G. Planchon.
Le Kermès du Chêne. Par Dr. G. Planchon.
Commentar zur Preussischen Pharmacopœia. Von Friedrich Mohr, Ph.D. From the respective Authors.
Specimen of Cape Saffron. From Mr. David Bain.
Specimen of Hashish Sweetmeat. From Mr. P. Squire.

Mr. SHILLCOCK, of Bromley, exhibited and explained to the meeting a Bottle with a Stopper-protector, which he had designed for the prevention of accidental poisoning. This led to a discussion, in which the Chairman and Messrs. Mackay and Morson took part. The general feeling of the meeting was, that although some protection was afforded by poison-bottles, and more especially by poison-cupboards, the great safeguard was in the intelligence and care exhibited by those to whom the handling of remedies was confided.

The following papers were read:—

ON THE "PHOSPHATE OF AMMONIA" OF THE BRITISH PHARMACOPŒIA.

BY MR. JOHN WATTS, SENIOR BELL SCHOLAR.

It was not my intention, in the first instance, to have laid this paper before the Pharmaceutical evening meeting, as being a subject which scarcely warranted such attention; but as Dr. Redwood at the last meeting of the "Chemical Discussion Association" seemed particularly to desire it, I have ventured, with some further analyses and addenda, to present it again this evening. That the field for criticism of the Pharmacopœia is almost exhausted, is obvious to any one who has read the 'Pharmaceutical Journal,' or analogous transactions; still one or two minor subjects remain which might be investigated, though even their investigation is of no particular importance, either in a chemical or medical point of view. Now, as regards some substances, the statements of the Pharmacopœia could only be called in question by a practical application of its processes for the production of the article required, and ascertaining by that means how such a method answered, whether it yielded a good product, etc., or otherwise, as we have had exemplified in the various criticisms on perchloride of iron, nitrite of soda, etc.; but again, on the other hand, we find some points, especially those connected with the formulæ adopted, where a few concise experiments are all that are required to set the matter, where the doubt exists, at once at rest; as was the case with the experiments concerning the "hydration of sulphuric acid," the "water of crystallization in granulated sulphate of iron," etc., and also, as in the present instance, is the case with the "phosphate of ammonia."

Medicinally, phosphate of ammonia is a salt of but little importance, and administered probably more for the sake of its phosphoric acid than for that of the ammonia; still the composition assigned to it by the Pharmacopœia was doubtful, and although an unimportant salt, that is no reason why it should have an incorrect formula. It was therefore to ascertain the true composition of this salt, more especially its proportion of ammonia, when made according to the directions of the British Pharmacopœia, that the present series of experiments were made and noticed. I would first mention its preparation, as officinally given, which is the following:—20 oz. of dilute phosphoric acid are taken of sp. gr. 1·08, and 8 oz. of strong liquid ammonia added; the crystalline precipitate which forms, is ordered to be redissolved with a gentle heat, and the solution set aside to crystallize; the crystals to be rapidly dried without heat, and enclosed in a stoppered bottle. As regards the criticism of its preparation,—hereafter; at present its composition, when this particular method is employed as its source, is the question at issue. By referring to the Pharmacopœia, we find it there stated to consist of $3\,NH_4O, PO_5 + 5\,HO$. Now generally speaking, when neutralizing phosphoric acid with an alkali, we do not get a salt containing 3 atoms of base, but one consisting of 2 atoms of base, 1 of basic water, and 1 of acid, and in the present instance its composition is still more doubtful, inasmuch as authentic works state that the triammoniac salt, even should it be formed, cannot be dried and preserved so as to retain the same composition. My own experience bears out this latter fact, within certain limits, for I found that even in preparing the salt for analysis, using merely ordinary precautions, ammonia was so rapidly given off that the estimated NH_4O was therefore somewhat too low, and consequently the PO_5 rather too high, giving to the analysis rather an unscientific appearance; still, I am happy to say that the results show that for once the formula given by the Pharmacopœia is correct. Of salt so prepared,—

·393 gramme gave 38·06 per cent. of PO_5.
·407 ,, ,, 38·02 ,, ,,

These were estimated by a volumetric solution of nitrate of uranium; and again, ·532 gramme gave 37·89 per cent. PO_5, estimated as pyrophosphate of magnesia. By combustion with soda-lime by Varentrapp's process,—

·255 gramme gave 39·05 per cent. NH_4O.
·410 ,, ,, 38·2 ,,

The percentage composition of the Pharmacopœia salt containing—

$$\begin{aligned} 3\,NH_4O &= 40{\cdot}20 \\ PO_5 &= 36{\cdot}59 \\ 5\,HO &= 23{\cdot}21 \\ \hline & 100{\cdot}00 \end{aligned}$$

it will be seen therefore, as before stated, that the ammonia is a trifle lower, and the acid higher, in a proportionate degree; moreover, it would have taken a great deal of trouble to have prevented this loss, which the importance of the subject scarcely warranted, even if it could have been done; otherwise these percentage compositions would without doubt have absolutely agreed. Only in one case does the difference amount to more than $1\frac{1}{2}$ per cent., and a loss of only one milligramme (·001) in the substance operated on becomes increased to nearly one per cent. when multiplied so many times in order to obtain the percentage. It is obvious then from these analyses that the phosphate of the Pharmacopœia is decidedly a triammonic salt, or one which contains 3 atoms of ammonia united with 1 atom of phosphoric acid; and it is also a curious fact that no analysis of such salt has been published, possibly from the errors which arise from the loss of ammonia. Mitscherlich, who examined these phosphates, published results only of the di- and monammonic varieties; and Gmelin, quoting Berzelius as his authority, mentions concerning the triammonic, merely that it is precipitated from a solution of the disalt, by mixing it with excess of ammonia, without saying anything about the possibility of its being redissolved and crystallized. From the words he uses, I conclude he thought it impracticable. In analysing these phosphates it is impossible to ascertain whether the sample be tri- or diammonic by estimating merely the ammonia, since both salts contain it in almost the same proportion as regards weight, owing to the fact that one contains 5 atoms of water of crystallization, the other none; by estimating the phosphoric acid instead, we of course immediately see which sample we have in hand. It was mentioned the other evening as being rather an unlikely fact, that the salt would contain an uneven number of atoms of water of crystallization. Now I did not undertake so much to *establish* a formula for the salt, as to ascertain whether, when made according as the Pharmacopœia directed, it contained 3 atoms of ammonia or no. Moreover, the analysis would have to be conducted differently to speak definitively upon this latter point, as the water must be directly determined; still the reasons advanced are, I think, scarcely tenable, inasmuch as we have a very great number of salts which do contain uneven atoms, and as regards the possibility of writing the formula with the double oxygen atom, it would stand $2\,[(NH_4)_3, PO_4]+5\,H_2O$,—a formula truly somewhat complex, yet nevertheless correct. I next analysed some commercial specimens of the phosphate, to see the composition of the salt in general use. I confess I did not expect to find 3 atoms of base, nor was I disappointed, for the mean of several experiments gave 53·29 per cent. of PO_5, the percentage composition of the diammonic salt containing 53·79, PO_5; the formula of these salts exactly coincided. As the specimens examined were purchased since the British Pharmacopœia came out, it is obvious that either the salt was not made according to its directions, or else that it was old stock in hand previous to its appearance. It is scarcely likely, I think, that a salt made with 3 atoms of NH_4O, unless very carelessly kept, would become so entirely converted into that containing only 2 atoms, as to give a percentage agreeing so exactly with the calculated one.

Seeing therefore the difference in composition between the commercial and officinal varieties, the next point to be considered is which is the best salt for medicinal use, and which can be most readily and economically prepared. The mention of a very few facts will, I think, at once decide in favour of the former. In preparing the Pharmacopœia salt, a very large excess of ammonia is used to neutralize the phosphoric acid, consequently, when the solution is warmed to redissolve the precipitated phosphate, a considerable quantity is evolved; that is, to say the least, wasteful, considering that ammonia is rather a valuable alkali; and again, when evaporating the liquor down from the first crystallization, so much ammonia is lost that one-fourth part more has to be added to bring the salt back again to the triammonic state, it having of course passed during evaporation to the diammonic. The product also obtained is exceedingly unstable. Now this is after all the great point, for what is the use of getting a salt containing an extra atom of ammonia, if when we have got it we cannot keep it there. A shop-bottle continually dispensed from would soon contain a considerable portion of the disalt, and on the large scale it would be found impracticable to dry the salt properly, and bring it into a saleable state, as it requires to be put under a bell-jar on a porous tile for some days,—an impracticable proceeding when operating on much more than a pound. As an instance of the rapidity with which the salt loses ammonia, some crystals exposed to the air for two hours had entirely lost the third atom; and in one of the specimens on the table many of the crystals will be seen to have affloresced, from being left for a couple of days under a bell-jar, with a capsule containing sulphuric acid. Now the salt containing 2 atoms of NH_4O is open to none of these disadvantages; it is perfectly stable, very readily prepared, and no great loss occurs in its manufacture. It may be made from bone-ash on the commercial scale, by the same process as "phosphate of soda" is now prepared; or pharmaceutically, from phosphoric acid, by neutralizing with ammonia, and evaporating to crystallization, taking care to keep the solution neutral, or faintly alkaline. When this latter point is carefully observed the resulting crystals have the exact composition, $2NH_4O, HO, PO_5$. If the solution be allowed to get acid, the result is not the same; several analyses showed them to be a mixture of di- and monammonic varieties.

·4665 gramme gave 57·9 per cent. of PO_5,
·4365 „ „ 57·34 „ „

a percentage exactly intermediate between the two mentioned compositions.

There is little doubt then, I think, but that the diammonic salt is the one which will always be used in pharmacy; and it is rather remarkable that a member of the Pharmacopœia Committee, the only person I can remember having prescribed the salt, which he used to do in combination with Potass. Bicarb. and Lithiæ Cit., always directed the phosphate and carbonate to be well dried previous to mixing the whole together, which drying was effected by wrapping the salts loosely, and placing before a fire, or in a warm situation. How could the triammonic salt exist in such a condition, when even a considerable portion of the ammonia of the diammonic was volatilized? Perhaps the next edition of the Pharmacopœia may correct such incongruity.

There is only one more subject which I wish slightly to notice, and which moreover being so intimately connected with the phosphates, is perhaps not out of place, viz. the arseniates of the same base. Now every word that has been mentioned regarding the phosphates is applicable in all its cases to the arseniates, of course substituting AsO_5 for PO_5. The triammonic arseniate is produced in the same way, has the same composition, and agrees in every respect with its corresponding phosphate: the same notice is applicable to the other varieties.

The arseniate of commerce proved from analysis to be a mixture of di- and monammonic salts; its solution was faintly acid, and was most probably made by crystallizing a solution of arseniate, without seeing that it was slightly alkaline before setting it aside. The composition of the arseniate used in analysis, as given in most chemical works, is $3\ NH_4O, AsO_5$; this therefore is obviously incorrect.

Dr. Attfield inquired if Mr. Watts had made any experiments on the solubility of uric acid, and the urates of soda and lime, in solution of phosphate of ammonia. We were told that this salt was given in gout and rheumatism, to render these bodies soluble. There certainly would be a probability of urate of ammonia being formed, if the alkaline salt ever came in contact with the uric acid or urates in the blood or urine; but unfortunately urate of ammonia was even less soluble than the original urates, hence the pain and inconvenience attending gouty concretions, and calculi might be increased rather than diminished by the administration of phosphate of ammonia. In the absence of evidence to the contrary, chemical facts would suggest that bicarbonate of potash would be the salt whose exhibition would offer the greatest advantages, as urate of potash was more soluble than any other urate.

Mr. Watts said he had not made any experiments in the direction suggested by Dr. Attfield.

ON A BETTER MODE OF PREPARING RED OXIDE OF MERCURY OINTMENT FOR APPLICATION IN CERTAIN CUTANEOUS DISEASES.

BY ALEX. BALMANNO SQUIRE, M.B., ETC.

Having had frequent occasion to make use of ointments containing the red oxide of mercury in the treatment of chronic disease of the skin, it occurred to me that the activity of that ingredient might be greatly increased by its being prepared in a different manner to that directed in the British Pharmacopœia. On making trial of my new preparation, I found it not only more pleasant to the patient, but decidedly more efficient as a remedy.

My original opinion has now been confirmed by a pretty extensive use of both preparations, and as a revised edition of the Pharmacopœia is expected shortly, and the remedy is one of extensive use, I have thought the subject worthy of the attention of the Pharmaceutical Society.

It will be well, in the first place, to review the modes in which the binoxide has been directed to be prepared in the British, and in the preceding London Pharmacopœias.

In the British Pharmacopœia, under the name of red oxide of mercury, it is directed to be prepared by the action of nitric acid on metallic mercury, and the subsequent application of heat to a mixture of the resulting nitrate with metallic mercury.

In the last London Pharmacopœia, under the name of nitric oxide of mercury, it is prepared by the application of heat to the nitrate.

In the last London Pharmacopœia but one, two different processes are given: the one is almost identical with the process last mentioned, and its product is called the nitric oxide; the other is the decomposition of a solution of corrosive sublimate by a solution of potash, and its product is termed the binoxide.

The ointment in this last-mentioned Pharmacopœia is prepared from the nitric oxide, the binoxide being used only in the preparation of the bicyanide of mercury. It is my object this evening to show that the binoxide should have been chosen for the ointment rather than the nitric oxide, and to give what I trust may be thought sufficient reasons for advocating the revival of the former in the British Pharmacopœia, not indeed for the purpose for which it was formerly introduced, but as an infinitely better substance than that now used for the preparation of the red oxide of mercury ointment.

Oxide of mercury ointment appears always to have been prepared with the nitric oxide; it is so directed not only in the British Pharmacopœia, but in the London Pharmacopœias of 1851, 1836, 1824, and 1809.

One possible reason for this preference for the nitric oxide is, that in the condition of scales, the oxide of mercury is less capable of adulteration, since its physical properties, *e. g.* the reflection of light from the glittering scales, enable it to be more readily recognized.

But one can readily understand how the so-called binoxide should be a more active remedy.

A mere comparison of the naked-eye appearance of the one with that of the other will suffice to show how much smaller the particles of the binoxide are: theirs is a paler and a duller colour. There is, in fact, just the difference that is seen between coarsely-pounded coloured glass and the same glass finely pulverized.

Under the microscope this difference is yet more clearly perceptible. An examination of the precipitated oxide shows that none of its particles exceed the thirty-thousandth of an inch in diameter; while the same scrutiny applied to the best levigated nitric oxide shows that although a great number of its particles scarcely exceed the size just mentioned, many of them are as large as the five-hundredth of an inch. The diameter of a large proportion of the particles of the unlevigated nitric oxide is as much as the one-hundredth of an inch.

The advantages of ointment made with the precipitated oxide of mercury, over that made with the so-called nitric oxide, are, in the first place, that supposing ointments of equal therapeutical value be used, greater economy is gained by the use of the precipitated oxide, since a less proportion of it will suffice in the same quantity of ointment.

But there is a more serious objection to be urged against the use of the nitric oxide, and that is, that the presence of a quantity of gritty particles in an ointment which is to be rubbed in over a raw and irritable portion of skin, produces a totally different action in it to what is sought for when an ointment of the red oxide of mercury is employed.

One of the uses of the ointment of the flowers of sulphur in the treatment of scabies is, that the gritty particles of sulphur do, as it is rubbed in over the skin, actually rupture the tunnels in the epidermis in which the *acarus scabiei* resides, and so lay bare the itch-mite to the poisonous influence of the sulphur; and although the particles of well-levigated oxide are much less coarse than those of the sulphur, still it must be remembered that they are applied usually to much more delicate surfaces.

This disadvantage in the use of nitric oxide I have more especially noticed in hospital and dispensary practice, where the oxide employed, except for ophthalmic use, is often by no means carefully levigated, and where the introduction of ointment made with the precipitated oxide would ensure, irrespective of quality, a fine division of the particles.

But I have also often had occasion to observe on the skins of persons for whom I had prescribed ointment containing the levigated nitric oxide, and whose prescriptions had been made up by the first chemists, very obvious glittering red scales.

Here is some of the red oxide of mercury ointment of the British Pharmacopœia, and here again is the same preparation, except that precipitated has been substituted for nitric oxide; you may observe how much "smoother" an ointment the precipitated oxide makes.

However, although the fine state of division of the particles of the binoxide, and the consequent "smoothness" of the ointment made from it, are strong presumptive proofs in its favour, the absolute proof of its superiority over the nitric oxide is to be found in the fact, that patients who have first made use of the latter and then of the former, always declare, and that without any prompting, in favour of the binoxide.

A lady lately under my care accidentally underwent a *threefold* change, from nitric oxide to binoxide, and then back to nitric oxide again. She had suffered for the last sixteen years from a chronic cutaneous disease, which, notwithstanding that she had been under treatment the greater part of that time, had slowly but steadily got worse. The irritation occasioned by it was so intense and so unremitting, that it was a constant source of torment. In conjunction with other remedies, I directed the use of an ointment containing the nitric oxide. Although considerable improvement took place, it did not progress so rapidly as I desired; finding this, I wrote for precipitated oxide in place of nitric oxide, the treatment, except in this particular, being continued as before. The result was not only much more decided relief from the distress occasioned by the disease, and a more marked alteration in its appearance, but the ointment was praised as a much more agreeable application. A short time after this alteration had been made, the ointment, whose colour was masked by the presence of other ingredients, was accidentally made up by her chemist with the nitric oxide, and there being nothing in its appearance to indicate the difference it was used as before, but she complained that it seemed to have lost much of its efficacy, and the appearance of the diseased skin confirmed her statement. On examining the ointment and making inquiry of the dispenser, the cause appeared.

I mention this case, since it affords an instance where neither patient nor practitioner were aware of a change until it declared itself by its effects, and where a difference (in favour of the yellow oxide) was first noticed by a person who, having no theory to prove, was perfectly free from all prejudice.

I have since then frequently tried in appropriate cases ointments containing merely one or the other of the oxides, and the result has been uniformly in favour of the precipitated yellow oxide of mercury.

Dr. Attfield said, that not the least important point in any proposition to introduce a new substance into pharmacy was the character of the name by which it was designated. Mr. Squire had brought before their notice two varieties of the red oxide of mercury; one prepared by the old method of heating nitrate of mercury, the other by precipitation of solution of corrosive sublimate by potash. Mr. Squire had apparently experienced some difficulty in distinguishing between these varieties, and had not yet succeeded in stating the true distinction. The fact was that the old kind was perfectly free from water, while that precipitated from solution contained twenty per cent.; the one was *anhydrous red oxide*, the other *hydrated red oxide*.

Mr. Daniel Hanbury said that the house with which he was connected had many years since prepared for a well-known practitioner in skin diseases, a similar ointment to that now suggested by Mr. Balmanno Squire, but the old sort had been returned to.

NOTE ON CHINESE SAL AMMONIAC.

BY DANIEL HANBURY, F.L.S.

Among a numerous collection of Chinese drugs, a report upon which I published in the 'Pharmaceutical Journal' in the years 1860, 61, and 62, was a substance called *Naou sha*, which particularly excited my curiosity, on account of the enormous price at which it is valued by the Chinese, and the remarkable virtues ascribed to it. But as is the case with many similar substances (of which we are not without parallels in European medicine) the value of this drug proved to be due, not to its peculiar properties, so much as to the superstition and ignorance of those who sell or administer it.

The first sample I received was accompanied with the inquiry if it were not iodide of potassium, and had it been that substance one could hardly be surprised that even twenty dollars an ounce might be paid for it. It was a rounded fragment of a substance of dark colour and compact crystalline structure, which chemical examination proved to be chloride of sodium. Since his return from China, my friend Mr. Lockhart has kindly placed in my hands a more ample supply of this substance, the examination of which has shown that though essentially chloride of sodium, it contains traces of alkaline sulphuret, and that it resembles in composition and general appearance one of the forms of impure chloride of sodium found in the bazaars of India under the name of *Black Salt.*

Tatarinov in his 'Catalogue of Chinese Medicines'* represents the name *Naou-sha*, to be applied to sal ammoniac of volcanic origin, and in Pekin at least such is truly the case. When my friend Mr. Lockhart was residing in that capital in charge of the hospital established under the auspices of the London Missionary Society, he took the opportunity of making some inquiries regarding the drug in question, and very recently he has handed me several specimens of it obtained in the Pekin shops. The information Mr. L. elicited was not very copious, in fact all he could learn amounted to this,—that *Naou-sha* is brought from certain volcanic springs in the province of Sze-chuen, and in Thibet, and that the various kinds of it, differing from one another chiefly in their degrees of purity, are distinguished by the names *Naou-sha*, *Yen-naou*, and *Shih-naou.*

The specimens received from Mr. Lockhart were of three kinds, the purest of which consisted of a compact, crystalline, colourless, saline mass, which analysis proved to be chloride of ammonium. The second kind was also chloride of ammonium but of different appearance, having more of the aspect of a natural production than the first. The third specimen was likewise chloride of ammonium, but much contaminated with earthy matter.

There can be no doubt, I think, that this Chinese sal ammoniac is a volcanic product, such as is known to occur on Etna, Vesuvius, and Hecla, as well as in the vicinity of ignited coal-seams. Whether it is by ignorance or design that the Chinese confound with an impure form of common salt, I cannot affirm; but the circumstance calls to mind the fact proved by Beckmann,† that the sal ammoniac of the ancients was common rock-salt, dug from pits near the temple of Jupiter Ammon in Egypt, and that the name was subsequently transferred so chloride of ammonium manufactured in that country from the dung of camels.

PHARMACEUTICAL SOCIETY, EDINBURGH.

A meeting was held in St. George's Hall, on Wednesday evening, March 15th, at 9 o'clock; Mr. Kemp, President, in the chair.

Mr. D. R. Brown, Vice-President, made a communication on Specific Gravity, and illustrated many of his observations by sundry experiments. At the conclusion of Mr. Brown's address, Mr. Stevenson, F.R.S.S.A., entered more fully into the practical part of the subject, showing and explaining a great variety of instruments formerly in use, as well as most of those at present recognised by distillers, brewers, and others. Amongst the most interesting illustrations were some very ancient, and now obsolete contrivances for taking specific gravity, and Mr. Stevenson's own simple but ingenious invention, which

* Catal. Med. Sinens., p. 41.

† History of Inventions and Discoveries.

he described to the Society several years ago, and a woodcut of which appeared in the Journal, along with a full description of its use and application. Mr. Stephenson moved a vote of thanks both to Mr. Brown and Mr. Stevenson, which was seconded by Mr. Mackay, and carried with acclamation.

The meeting thereafter adjourned.

PROVINCIAL TRANSACTIONS.

GLASGOW CHEMISTS AND DRUGGISTS' FESTIVAL.

The Fifth Annual Soirée, Concert, and Assembly of the Glasgow Chemists and Druggists, under the auspices of the Glasgow Chemists and Druggists' Association, was held in the Merchants' Hall, on Thursday evening, February 2nd. Hugh Hart, Esq., occupied the chair. He was accompanied to the platform by a deputation from the Pharmaceutical Society, Edinburgh, consisting of Messrs. Kemp (President), Gardner, Blanshard, and Brown; by Drs. A. M. Robertson, Paterson, Wilson, Morton, Tannerhill, Milner, etc., and Messrs. William Murdoch, Kinninmont, Campbell, Maccall, Moffat, Taite, Jardine, Black, Brodie, etc.

There was a large assemblage of ladies and gentlemen present, amounting to 446, who, after listening to an address from the President (which we are compelled to omit for want of space), were entertained in a manner that proved highly satisfactory and edifying.

ORIGINAL AND EXTRACTED ARTICLES.

A BILL TO REGULATE THE QUALIFICATIONS OF CHEMISTS AND DRUGGISTS.

Bill No. 1, introduced by Sir Fitzroy Kelly.

Preamble.

Whereas it is expedient for the safety of the public that persons carrying on the business of a Chemist and Druggist, by retail, in the keeping of open shop for the compounding of the prescriptions of duly qualified medical practitioners, should possess a competent practical knowledge of such business, and to that end that persons before commencing such business should be duly examined as to their skill and knowledge, and that a Register should be established and kept of all persons carrying on such business; and also, that the Act passed in the fifteenth and sixteenth years of the reign of Her present Majesty, intituled "An Act for Regulating the Qualifications of Pharmaceutical Chemists," hereinafter described as the Pharmacy Act, should be amended: Be it enacted by the Queen's Most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same:

After the 1st January, 1866, all Chemists and Druggists, if not Pharmaceutical Chemists, to be examined.—Saving rights of Chemists and Druggists then in business.

1. From and after the *first day of January, one thousand eight hundred and sixty-six*, it shall not be lawful for any person to carry on the business of a chemist and druggist in the keeping of open shop for the compounding of the prescriptions of duly qualified medical practitioners in any part of Great Britain, unless such person shall be a Pharmaceutical Chemist within the meaning of the Pharmacy Act, or shall be duly registered as a Chemist and Druggist under this Act; and no person shall be registered as a Chemist and Druggist under this Act unless he shall before the *first of January, one thousand eight hundred and sixty-six*, have carried on business as a Chemist and Druggist, or shall have been registered as an Assistant as herein provided, or shall have been examined by examiners, and have received a certificate of competent skill and knowledge.

Examiners under Pharmacy Act to be the Examiners under this Act.—Certificate of competent skill, etc.

2. All such persons as shall from time to time have been appointed to conduct examinations under the Pharmacy Act shall be and are hereby declared to be examiners for the purposes of this Act, and are hereby empowered and required to examine all such persons as shall tender themselves for examination under the provisions of this Act; and any person who shall have been examined by such examiners, and shall have obtained from them a certificate of competent skill and knowledge and qualification to be registered as a Chemist and Druggist, shall be entitled to be registered as a Chemist and Druggist under this Act; and the examination aforesaid shall be such as is now in use under the Pharmacy Act for the purposes of a qualification to be registered as Assistant under that Act, or as the same may be varied from time to time by any Bye-law to be made in accordance with the Pharmacy Act, with the approbation of one of Her Majesty's Principal Secretaries of State.

Registrar under Pharmacy Act to be Registrar under this Act.

3. The Registrar appointed or to be appointed under or by virtue of the Pharmacy Act shall be the Registrar for the purposes of this Act.

Chemists and Druggists in business in Great Britain before 1st January, 1866, entitled to be registered as Chemists and Druggists.

4. Any person who before the *passing of this Act* has been or who before the *first day of January, one thousand eight hundred and sixty-six*, shall be actually carrying on business in Great Britain as a Chemist and Druggist, in the keeping of open shop for the compounding of the prescriptions of duly qualified medical practitioners, shall be entitled to be registered, on producing to the Registrar a declaration according to the form in the Schedule (B.) to this Act, signed by him, and also a declaration according to the form in the Schedule (C.) to this Act, signed by a duly qualified medical practitioner, or upon transmitting to such Registrar information of his name and address, and enclosing such declarations as aforesaid.

Assistants may be registered as Chemists and Druggists under this Act.

5. Every person who before the *passing of this Act* has been actually engaged and employed as an Assistant to any "Chemist and Druggist" in Great Britain, and has attained the age of twenty-one years, and who shall prior to the *first day of January, one thousand eight hundred and sixty-six*, present or cause to be presented to the said Registrar a certificate according to the form set forth in Schedule (D.) to this Act, signed by himself and by any Chemist and Druggist, shall be entitled to be registered as a Chemist and Druggist under this Act.

Assistants and Associates under Pharmacy Act may be registered as Chemists and Druggists.

6. All persons who are or shall be duly registered as Assistants or Associates under or according to the provisions of the Pharmacy Act shall be entitled to be registered as Chemists and Druggists under this Act.

Council of Pharmaceutical Society to make Orders for regulating Registers to be kept.

7. The Council of the Pharmaceutical Society of Great Britain shall, with all convenient speed after the *passing of this Act*, and from time to time as occasion may require, make orders or regulations for regulating the Register to be kept under this Act, as nearly as conveniently may be in accordance with the form set forth in the Schedule (A.) to this Act, or to the like effect.

Duty of Registrar to make and keep correct Registers.

8. It shall be the duty of the Registrar to make and keep a correct Register, in accordance with the provisions of this Act, of all persons who on or after the *first day of January, one thousand eight hundred and sixty-six*, shall be entitled to be registered as Chemists and Druggists under this Act, and to erase the names of all registered persons who shall have died, and from time to time to make the necessary alterations in the addresses of the persons registered under this Act; and to enable the Registrar duly to fulfil the duties imposed upon him it shall be lawful for the Registrar to write a letter to any registered person, addressed to him according to his address on the Register, to inquire whether he has ceased to carry on business or has changed his residence; and if no answer shall be returned to such letter within the period of six months from the sending of the letter, it shall be lawful to erase the name of such person from the Register: Provided always, that the same may be restored, by direction of the Council of the Pharmaceutical Society of Great Britain, should they think fit to make an order to that effect.

Evidence of qualification to be given before registration.

9. No name shall be entered in the Register unless the Registrar be satisfied by the proper evidence that the person claiming is entitled to it; and any appeal from the decision of the Registrar may be decided by the Council of the Pharmaceutical Society of Great Britain; and any entry which shall be proved to the satisfaction of such Council to have been fraudulently or incorrectly made may be erased from or amended in the Register by order in writing of such Council.

Annual Register to be published and be evidence.

10. The Registrar shall in every year cause to be printed, published, and sold a correct Register of the names of all Pharmaceutical Chemists, and a correct Register of all persons entitled to carry on the business of Chemists and Druggists; and in such Registers respectively the names shall be in alphabetical order according to the surnames, with the respective residences, in the form set forth in Schedule (A.) to this Act, or to the like effect, of all persons appearing on the Register of Pharmaceutical Chemists, and on the Register of persons entitled to carry on the business of Chemists and Druggists, on the first day of January in every year; and such Register shall be called "The Register of Pharmaceutical Chemists and Chemists and Druggists;" and a copy of such Registers for the time being, purporting to be so printed and published as aforesaid, shall be evidence in all Courts and before all Justices of the Peace and others that the persons therein specified are registered according to the provisions of the Pharmacy Act and of this Act respectively; and the absence of the name of any person from such copy shall be evidence, until the contrary shall be made to appear, that such person is not registered according to provisions of the Pharmacy Act or of this Act.

Penalty on wilful falsification of Register.

11. Any Registrar who shall wilfully make or cause to be made any falsification in any matter relating to the said Registers shall de deemed guilty of a misdemeanor in England, and in Scotland of a crime or offence punishable by fine or imprisonment, and shall on conviction thereof be imprisoned for any term not exceeding *twelve months*.

Penalty for obtaining Registration by false representations.

12. If any person shall wilfully procure or attempt to procure himself to be registered under the Pharmacy Act or under this Act, by making or producing or causing to be made or produced any false or fraudulent representation or declaration, either verbally or in writing, every such person so offending, and every person aiding or assisting him therein, shall be deemed guilty of a misdemeanor in England, and in Scotland of a crime or offence punishable by fine or imprisonment, and shall on conviction thereof be sentenced to be imprisoned for any term not exceeding *twelve months*.

Penalty for falsely pretending to be a registered person, or keeping open shop for dispensing said prescriptions, not being registered.

13. Any person keeping open shop for the sale or compounding of drugs by retail who shall wilfully and falsely pretend to be, or take, use, or exhibit the name or title of a Pharmaceutical Chemist, or Chemist and Druggist, or Chemist or Druggist, or any name, title, addition, or description implying that he is registered under the Pharmacy Act or this Act, or that he is recognised by law as a Pharmaceutical Chemist, or a Chemist and Druggist; and any person not duly registered as a Pharmaceutical Chemist, or a Chemist and Druggist, who shall keep open shop for the compounding of the prescriptions of any duly qualified medical practitioner, shall for every such offence be liable to pay a penalty or sum of *five pounds*.

Application of fees to purpose of Pharmaceutical Society.

14. Such fees shall be payable upon every such examination and regulation as aforesaid as shall from time to time be fixed and determined by any bye-law to be made in accordance with the Pharmacy Act, with the approbation of one of Her Majesty's principal Secretaries of State, and shall be paid to the Treasurer of the said Society, for the purposes of the said Society.

Application of penalties as Secretary of State may direct.

15. Any sum or sums of money arising from the recovery of penalties as aforesaid, shall be paid as the Commissioners of Her Majesty's Treasury shall direct, and the same may be sued for and recovered in the manner provided by the Pharmacy Act for the recovery of penalties under that Act.

16. Every person duly registered as a Chemist and Druggist, and having (whether before or after such registration) been examined and certified as aforesaid, shall be eligible to continue or to be elected an Associate as aforesaid, and may publicly use the title or description Associate of the Pharmaceutical Society of Great Britain; and every such person so continuing or elected as such Associate shall have the privilege of attending all meetings of the said Society, and of voting thereat, and otherwise taking part in the proceedings of such meetings in the same manner as members of the said Society, but shall not have or exercise any other of the rights or privileges of such members.

Registered Chemists and Druggists, having passed Minor Examination, may be elected as and continue and use title of Associate of Pharmaceutical Society, and may vote at meetings of the Society.

17. Nothing in this Act contained shall extend, or be construed to extend, to lessen or prejudice, or in anywise to interfere with, any of the rights, authorities, privileges, and immunities heretofore vested in and exercised and enjoyed by any duly qualified medical practitioner.

Saving of rights of duly qualified medical practitioners.

18. And, whereas by the Charter of incorporation of the said Pharmaceutical Society of Great Britain, it is provided that the Council of the said Society shall have the sole control and management of the real and personal property of the said Society, subject to the bye-laws thereof, and shall make provision thereout, or out of such part thereof as they shall think proper, for the relief of the distressed Members or Associates of the said Society and their widows and orphans, subject to the regulations and bye-laws of the said Society; and whereas, for extending the benefits which have resulted from the said provision in the said Charter of Incorporation, it is desirable that additionable powers shall be granted to the said Council: be it enacted, that from and after the said 1st day of January, 1866, the said Council may make provision out of the real and personal property aforesaid, and out of any special fund known as the Benevolent Fund, not only for the relief of the distressed Members or Associates of the said Society and their widows and orphans, subject to the said regulations and bye-laws, but also for all persons who may have been and have ceased to be Members or Associates of the said Society, or who may be or have been duly registered as "Pharmaceutical Chemists" or "Chemists and Druggists," and the widows and orphans of such persons, subject to the regulations and bye-laws of the said Society.

Benevolent Fund may be applied to past members and Associates, also to Pharmaceutical Chemists, and registered Chemists and Druggists.

19. This Act may be described as the Chemists and Druggists Act, 1865.

Title of Act.

SCHEDULE A.

Name.	Residence.	Qualification.
A. B.	Oxford Street, London.	In business prior to January, 1866.
C. D.	George Street, Edinburgh.	Examined and certified.

SCHEDULE B.

Declaration required of a person who claims to be registered as a Chemist and Druggist, upon the ground that he was in business as a Chemist and Druggist in Great Britain before the 1st day of January, 1866.

To the Registrar of the Pharmaceutical Society of Great Britain.

I, , residing at , in the County of , hereby declare that I was in business as a Chemist and Druggist, in the keeping of open shop for the compounding of the Prescriptions of duly qualified Medical Practitioners at , in the County of , on or before the 1st day of January, 1866.

Signed (Name.)

Dated this day of , 18 .

SCHEDULE C.

Declaration to be signed by a duly qualified Medical Practitioner respecting a person who claims to be registered as a Chemist and Druggist, upon the ground that he was in business as a Chemist and Druggist in Great Britain before the 1st day of January, 1866.

To the Registrar of the Pharmaceutical Society of Great Britain.

I, , residing at , in the County of , hereby declare that I am a duly qualified Medical Practitioner, and that to my knowledge , residing at , in the County of , was in business as a Chemist and Druggist, and in the keeping of open shop for the compounding of the Prescriptions of duly qualified Medical Practitioners, before the 1st day of January, 1866.

Signed

SCHEDULE D.

To the Registrar of the Pharmaceutical Society of Great Britain.

We hereby declare that the undersigned , residing at , in the County of , had before the passing of the Chemists and Druggists Act, 1865, been actually employed as an Assistant to a Pharmaceutical Chemist or Chemist and Druggist, and attained the age of twenty-one years.

As witness our hands, this day of , 1865.

A. B., Assistant.
C. D., Chemist and Druggist.

A BILL FOR REGULATING THE QUALIFICATIONS OF CHEMISTS AND DRUGGISTS IN ENGLAND AND WALES.

Bill No. 2, introduced by Sir John Shelley.

Preamble.

Whereas it is expedient for the safety of the public, and to prevent and avoid the mischief of ignorant and incompetent persons carrying on the trade of Chemists and Druggists, that persons exercising the business or calling of Chemists and Druggists, retailing or dispensing drugs and medicines, should possess a competent practical knowledge of drugs and medicines and other branches of knowledge, and should be duly examined as to their skill and knowledge by competent persons: Be it therefore enacted by the Queen's Most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

Title of Act.

1. That this Act shall for all purposes be cited as "The Chemists and Druggists Act."

Commencement of Act.

2. This Act shall commence and take effect from the *day of* .

Constitution of Council.—Registered Chemists and Druggists to vote for Members of the Council.

3. A Council, which shall be styled "The Council of Chemists and Druggists Society of England and Wales," shall be formed, to consist of a President, Vice-President, and in addition thereto of not less than *twenty-one* gentlemen, to be annually elected from the general body of Chemists and Druggists registered under this Act; that all registered Chemists and Druggists shall be entitled to vote for members of the said Council of Chemists and Druggists, and may give their votes either personally or by voting papers, signed by them in such form as shall be defined in the bye-laws of the said Council, such voting papers being transmitted under cover to the Secretary of the Council not less than clear days prior to the day on which the election is to take place.

4. *One calendar month's* notice of all meetings for the annual election of Members of the Council shall be given by advertisement, which shall specify the place, the day, and the hour of meeting, and the names of all gentlemen who may have been nominated as candidates for the office of members of the said Council; that after the first election of members of the Council as hereinafter provided for, the nomination of candidates shall be made in such form and at such time as shall be provided by the bye-laws of the Company.

One month's notice by advertisement of Election of the Council.

5. The President and Vice-President of the Council of Chemists and Druggists, and their successors, shall hold their offices for the term of *three years* respectively, and it shall be lawful for the General Council from time to time, as often as it may be necessary in case of the death, resignation, or incapacity to act of the president and vice-president, or either of them, before the expiration of their term of office, to nominate and appoint a successor or successors to fill the said offices of president and vice-president, or either of them, for the remainder of the term of office.

President and Vice-President to hold Office Three Years.—In case of Death, Resignation, etc., General Council to appoint successors.

6. Upon the *day of* in the year following the first election of Councillors under this Act, and in every succeeding year, *one third* part of the ordinary members of the General Council shall go out of office; and in the said year following the first election of councillors under this Act those who shall go out of office shall be the councillors who were elected under the provisions of such Act at the first election by the smallest number of votes; and in the next succeeding year those who shall go out of office shall be the councillors who were elected under the provisions of this Act at such first election by the next smallest number of votes, the majority of the whole Council always determining, when the votes for any such person shall have been equal, who shall be the persons so to go out of office, and thereafter those who shall so go out of office shall always be the councillors who have been for the longest time in office without re-election: provided always, that any councillor so going out of office shall be capable of being forthwith re-elected if then qualified as herein provided.

One-third of the Council to go out of office annually.

7. In case of the death, resignation, or incapacity to act of any member of the said Council before the expiration of his term of office, the other members of the Council may, from time to time, and as often as any such vacancies may arise, nominate and appoint a duly registered member of the Society to fill such vacancy for the remainder of the said term.

In case of death, resignation, &c. of Members of the Council, the other Members to appoint successors for the remainder of term.

8. For the purpose of putting the provisions of this Act in operation, it shall be lawful for one of Her Majesty's principal Secretaries of State to nominate and appoint a Commissioner, who shall by public advertisement in the 'London Gazette,' and in such public newspapers published and circulated in such of the principal towns and cities of England and Wales as he shall deem expedient, call a meeting of all persons carrying on the trade and business of Chemists and Druggists in England and Wales, such meeting to be held at some convenient place in the metropolis, at a day and hour to be specified in such advertisement in the 'London Gazette,' not earlier than *one calendar month* from the date of the publication of the advertisement in the 'London Gazette,' for the first election of a President and Vice-President and the members of the Council.

The Secretary of State to appoint a Commissioner to put the Act in operation.—Commissioner to call a public meeting of Chemists and Druggists, by advertisement, to be held in the metropolis.

9. At such meeting so called, the said Commissioner shall proceed to the election of a President, Vice-President, and the *twenty-one* members of the Council, and shall determine the said election by the votes of the Chemists and Druggists present at such meeting; that the names of all persons, with their addresses and occupations, intended to be proposed as candidates, shall be sent in to the said Commissioner at the Secretary of State's Office at the least *one week* before the day of the said election, and that no other candidates shall be put up for election at the said

At such meeting President, Vice-President, and Members of the Council to be elected.

In case of dispute, the Commissioner appointed to hear and determine and report thereon to the Secretary of State.

meeting; that in case of any dispute of what nature soever affecting the result of the said election, the said Commissioner shall have power to hear and determine the same in such manner and at such time after the said meeting as he shall think fit, and shall have power to examine witnesses, and if necessary on oath, and having heard and determined the same, he shall thereupon determine and report to one of Her Majesty's principal Secretaries of State on whom the said election has fallen, and the number of votes recorded for each successful candidate, and thereupon it shall be lawful for Her Majesty's said principal Secretary of State to ratify and confirm the said election or to annul the same, and direct the said Commissioner to proceed forthwith to another election: Provided always, that in case of the said election being annulled and a fresh election directed, the said Commissioner shall proceed in the manner hereinbefore provided, and Her Majesty's said principal Secretary of State shall have power to ratify or annul such fresh election, and direct another fresh election, and shall have further power to direct any number of fresh elections until he shall be satisfied that the said President, Vice-President, and the *twenty-one* members of the Council have been fairly elected; provided always, that when the said election of President, Vice-President, and the *twenty-one* members of the Council have been ratified by Her Majesty's said principal Secretary of State, such election shall be deemed valid and effectual for all purposes, and no proceeding shall be taken in any of Her Majesty's Courts of Law or Equity for the purpose of reviewing or annulling the same.

The Secretary of State may confirm or annul the election, and order another to take place.

No proceeding to be taken in any Court of Law or Equity to annul election when ratified by Secretary of State.

Upon such first election the President and Council and their successors to become a body corporate.

10. Upon such first election, so ratified as aforesaid, the President and Vice-President, and the members of the Council of the Chemists and Druggists' Society of England and Wales, and their successors, shall become and be a body corporate, and shall become and are hereby incorporated by the name of the Chemists and Druggists' Society of England and Wales, for the purposes of this Act, and shall have a common seal, and shall and may sue and be sued, and prosecute and be prosecuted by and in that name, either civilly or criminally, at law or in equity, and have, hold, and enjoy all the property and effects from time to time belonging or accruing to the said Society, and the same shall and are hereby vested in them and their successors as such corporate body.

A registrar and officers to be appointed by the Council.

11. The said Council shall have power to nominate and appoint a Registrar, and such officers and assistants as they may from time to time deem necessary for the purpose of the business of the said Society, and the said Registrar, officers, and assistants shall be removable from their offices at the will and pleasure of the said Council.

Treasurer to be elected.

12. The said Council shall from time to time elect a Treasurer, whose duties and qualifications shall be such as the Council shall from time to time direct; that no Councillor for the time being shall be eligible to the office of Treasurer, and that the Treasurer shall be removable from his office at the will and pleasure of the Council.

Council to appoint Examiners.

13. It shall be lawful for the said Council of Chemists and Druggists from time to time to nominate and appoint Examiners in such parts of England and Wales as they shall think fit, and to make rules and regulations for conducting the examinations of persons applying to be registered as Chemists and Druggists under this Act as to their knowledge of the nature of Drugs and Medicines in general use, with their Doses, and such Examiners are to report the result of such examination in each case to the said Council of Chemists and Druggists, who are hereby empowered to grant or refuse to such persons as in their decision may seem fit Certificates of competent skill and knowledge and qualification to exercise the business or calling of Chemists and Druggists, or, as the case may require, to be engaged or employed as apprentices or assistants respectively.

Retailers of Drugs not being qualified Physi-

14. All persons now keeping or who shall hereafter keep shop or store for the retailing of Drugs, and all persons who shall be in any manner

engaged in retailing or dispensing dangerous drugs, simple or compounded, as enumerated in Schedule (A.) of this Act or in the Bye-laws made as hereinafter empowered to be made, or in the retailing of other than patented medicines, such persons not being licenciates of the Royal College of Physicians of London, or the Royal College of Surgeons of England, or of the Society of Apothecaries of London, or persons registered under The Medical Act of 1858 or the Pharmacy Act of 1852, or apprentices to persons properly qualified within the meaning of this Act, shall produce to the Registrar appointed under this Act Certificates from duly appointed examiners of their competent knowledge of drugs and medicines in general use, with their doses, and of their ability to read physicians' prescriptions with ease and accuracy, and be registered as chemists and druggists upon payment of a sum of money to be fixed by the Council, not exceeding *one guinea*, for registration.

cians, Surgeons, or Apothecaries, or registered under the Medical or Pharmacy Act, or Apprentices, to produce Certificates from Examiners as to their competency, and to be registered under this Act.

15. Provided always, that any persons failing to produce certificates from examiners, as in the fourteenth section of this Act provided, but nevertheless claiming to be Chemists and Druggists or Chemists and Druggists' assistants and apprentices at the time of this Act coming into operation, shall and are hereby required to be registered as such upon making a declaration in the form specified in Schedule (B.) to this Act annexed, and the payment of a sum of money not exceeding *one guinea* for registration; and any person wilfully making a false declaration for the purpose aforesaid, shall be liable to a penalty not exceeding *fifty pounds*, to be recoverable in a summary way, by information and summons before any two of Her Majesty's Justices of the Peace, at the suit of the Chemists and Druggists' Society of England and Wales.

Chemists and Druggists at the passing of this Act to be registered.

16. No person who is required to be registered under the provisions of this Act shall be entitled to recover in any Court of Law or Equity any charge accruing after the coming into operation of this Act for any drugs or medicines as per Schedules (A.) and (C.) or the dispensing thereof, unless he shall prove upon the trial, by the production of a certificate purporting to be duly certified, that he is registered under this Act; and every person who shall offend against the provisions of this Act by retailing, dispensing, or compounding drugs and medicines, or by being engaged and employed in the retailing, dispensing, or compounding thereof, as provided in section fourteen, or employing unregistered assistants, shall be liable to a penalty or penalties not exceeding *five pounds* for every distinct act of retailing, dispensing, or compounding of which he may be guilty.

No person to recover for Drugs unless he produce on trial a Certificate of Registration.

Penalty on unqualified persons, and on employing unregistered Assistants.

17. It shall be lawful for the Council and they are hereby authorized and empowered to transact all business under this Act, and to make and establish such Bye-laws as they shall deem proper and necessary for the purposes contemplated by this Act, and from time to time to repeal, alter, and amend the same, or make new and additional Bye-laws: provided always, that all such Bye-laws, and all altered, amended, or additional Bye-laws, shall be confirmed and approved by one of Her Majesty's principal Secretaries of State; and it shall be lawful for the said Council to call Meetings of the registered Members of the Society of Chemists and Druggists from time to time for such objects connected with the purposes of this Act as they shall deem fit.

Power for the Council to make Bye-laws, to be confirmed by the Secretary of State.

Power to call Meetings of Chemists and Druggists.

18. All the Drugs and Chemicals enumerated and specified in Schedule (C.) to this Act annexed, or in the Bye-laws to be made hereafter, enumerated and specified as Poisons, shall, for the purposes of this Act, be deemed Active Poisons; and that no person shall knowingly sell the same, or any of them, in any quantities to any person, whom they may have reasonable grounds to believe to be under the age of twenty-one years, or to any person who is unknown to the seller, unless the sale is made in the presence of a witness who is known to the person selling the same, and to whom the purchaser is known, and who shall sign his name, together with his place of abode, in a book or books to be kept by

Restrictions and Penalty on the sale of Poisons.

the seller for such purpose to entries made at the time of sale therein of the day of such sale, and the quantities sold, and the purpose for which required: Provided always, that this provision shall not extend to the sale of any such Drugs or Chemicals when the same form part of the ingredients of any medicine required to be made up or compounded according to the prescription of any legally qualified Medical Practitioner or to the sale of such Drugs and Chemicals by wholesale and retail Chemists and Druggists upon orders in writing in the ordinary course of their business: Provided also, that any person offending against the aforesaid enactments shall be liable to a penalty, recoverable upon summary conviction before two Justices of the Peace, not exceeding *twenty pounds*, at the suit of the Chemists and Druggists' Society of England and Wales.

Penalty on unqualified Chemists and Druggists.

19. Any person or persons who shall keep shop, store, or other place for the retailing of drugs and medicines, and shall wilfully and falsely hold himself or themselves out or pretend to be or take or use the name or title of a Chemist and Druggist, or any name, title, addition, or description, such person or persons, being required by this Act to be registered under the provisions thereof, shall upon a summary conviction before two Justices of the Peace for any such offence pay and forfeit a sum of money not exceeding *twenty pounds*.

Mode of recovering Penalties.

20. All proceedings for the recovery of penalties under this Act shall be brought and carried on by the Council in their corporate name, and by no other persons; and any sums or sum of money recovered or adjudged to be paid by way of penalty under the provisions of this Act shall be paid to the Treasurer of the Council for the use and benefit of the said corporate body.

Certificates of Registration to be given by the Registrar on application..

21. The Registrar shall be bound, on the application of any person paying one shilling, to certify under his hand whether or no any person whose name and address shall be furnished to him appears in the said register of Chemists and Druggists or not; the certificate of such Registrar, purporting to be signed by the said Registrar and sealed with the corporate seal of any entries in the said register, shall in the absence of evidence to the contrary be sufficient evidence of the facts therein stated up to the date of the said certificate.

A Register of Chemists and Druggists to be kept.

22. The Registrar shall from time to time make out and maintain a complete register, and enter therein the names and addresses of all persons being Chemists and Druggists entitled to be registered under this Act, and also of all persons being registered assistants and apprentices respectively, and shall keep a proper index of the register, and all such other registers and books as may be necessary for the purposes of this Act, or required by the Council of the said Society.

Exemption of registered Chemists and Druggists from serving on Juries.

23. Every person who shall be registered under the provisions of this Act shall be exempt, if he so shall so desire, from serving on any jury or inquest whatsoever, and from serving in the militia.

Annual fee and appropriation of surplus funds of the Society.

24. An annual fee of *half-a-guinea* shall be paid by all Chemists and Druggists registered under this Act engaged in business as principals, and that any surplus monies remaining in the hand of the Treasurer after liquidating all demands and charges to be from time to time incurred in carrying out the objects of this Act, shall and may from time to time, and in such manner as the said Council shall see fit to set apart and appropriate to the formation and maintenance of a charity for the relief and benefit of poor Chemists and Druggists who may have been registered under this Act, and their families.

SCHEDULES TO WHICH THIS ACT REFERS.

SCHEDULE (A.)

DANGEROUS DRUGS.

The following are dangerous drugs to which Section 14 of this Act relates:—

Almonds, Essential Oil of.		
Antimony	Pharmaceutical	Preparations of.
Arnica	”	”
Barium	”	”
Bromine	”	”
Chloroform and	”	”
Cocculus Indicus	”	”
Creasote.		
Croton Oil.		
Deadly Nightshade and		”
Foxglove and	”	”
Grains of Paradise.		
Hellebore and	”	”
Hemlock and	”	”
Henbane and	”	”
Indian Hemp	”	”
Iodine and	”	”
Ipecacuanha and	Pharmaceutical	Preparations of.
Lettuce	”	”
Lobelia and	”	”
Lead	”	”
Male Fern	”	”
Meadow Saffron	”	”
Mercury	”	”
Nux Vomica and	”	”
Opium and	”	”
Oxalic Acid	”	”
Potash	”	”
Savin	”	”
Spanish Fly and	”	”
Thorn Apple	”	”
Tobacco	”	”
Wild Cucumber	”	”

SCHEDULE (B.)

NOTICE OF CLAIM BY EXISTING CHEMISTS AND DRUGGISTS.

To the Registrar of the Chemists and Druggists' Society of England and Wales.

I hereby give you notice that I claim to be registered as a Chemist and Druggist in the Register Book of the Chemists and Druggists' Society of England and Wales; and I hereby declare that I was a Chemist and Druggist [*or* was an Assistant or an Apprentice to a Chemist and Druggist, *as the case may be*] at the time of the Chemists and Druggists Act coming into operation.

Dated the day of the year .

Signed

SCHEDULE (C.)

ACTIVE POISONS.

The following are Active Poisons referred to in Section 18 of this Act:—

Aconite	Pharmaceutical	Preparations of.
Arsenic and	”	”
Atropine	”	”
Ergot of Rye and	Pharmaceutical	Preparations of.
Strychnine and	”	”
Veratrine	”	”

PHARMACEUTICAL LEGISLATION.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Your columns are freely open to all varieties of opinion, about the Pharmacy Bill as well as other things connected with our Society, but few letters published there will be read, I think, with greater surprise than that of Mr. Proctor in your last number. That he failed to convince his brother members of the Council will be less strange by far than that any member of the Council should hold the opinions he has advanced.

He says that unless the *trade* of a Chemist be placed under restrictions as well as the *title*, some other body of men will spring up under some other name, to take the place of the present Chemists and Druggists. Now, the great object of the present Bill is to place the *trade* of Chemists under complete restriction as far as the making up of prescriptions is concerned; Mr. Proctor wishes, instead of this, that the sale of a certain number of poisons should be prohibited. Whether this last plan would protect the trade more than the first we shall probably see as we go on; but at all events, protection to the *trade* is the object of one plan as much as the other.

If any man will take the trouble to draw up what he calls a Schedule of Poisons, which are in future only to be sold by Chemists who have passed an examination, and then will make inquiry of some practical man acquainted with the real requirements of the arts and manufactures of the country, and with the necessities of the public in all localities, in villages, hamlets, and thinly-peopled districts as well as large towns, he will find himself obliged to strike off one thing after another, until he feels that his Schedule, as "the one point to model a Bill upon to protect the trade," is a perfect absurdity.

He will see that the quantities used by Chemists of some of our most common and dangerous poisons are perfectly insignificant compared with those used in manufactures and compounds of daily need; that, to the makers of them, it would be hardly noticeable if the whole body of Chemists were to drop out of existence; that you must enact an examination for the painter, the dyer, the calico-printer, the paper-stainer, the photographer, the workers in glass and metal and a host of others, who all demand to buy their articles where they please and how they please, and where they can get them cheapest and most conveniently, and who would not tolerate any interference with their business by Chemists or anybody else. The list would be reduced still further by the requirements of the public who live far from towns, and who would claim to get at hand anything they stood in need of in case of emergency; and the Schedule of Poisons would be left in such a state that, if the *trade* could only be protected by prohibiting the sale of *these*, it would be a miserable protection indeed. "Parturiunt montes, nascitur ridiculus mus" would certainly be written upon the Bill whose "one simple point" was this.

Mr. Proctor says that in the provinces many Druggists make up prescriptions so seldom that the prohibition would be a thing they did not care for. Very well, then the Bill would leave them, in that respect where it found them, but it would still meet the complaint made by the public and the medical profession: that the lives of the sick are continually imperilled because the prescriptions, upon which their life or death may depend, may be made up by persons totally incompetent, and that there is no way by which the friends of the sufferer may guard themselves from this, for they can neither read the prescription themselves nor know by any title or distinction the educated man from the pretender. And if a prohibition to make up prescriptions would not seriously affect the trade of a Druggist, depend upon it, the Schedule which the former inquiry would have left would make very little difference to him.

Mr. Proctor says that there will be no difficulty in finding other titles than Chemist and Druggist to evade the Act, such as Medical Hall, etc. No doubt of it, and that is why the Bill does not confine itself to protecting a title, but protects also the trade, and awards a penalty for keeping open shop, *under any name*, for the making up of prescriptions. In every town the man who has a right to make up prescriptions will stand higher than the man who has not, whatever title he may give his establishment; he will have the best trade, whether the prescriptions that come be many or few.

I say but little upon the plan Mr. Proctor proposes as the practical result of all his arguments, viz. to give everybody, whoever he may be, ignorant or not, "Pharmaceutical Chemist or Grocer," the power to sell all sorts of poisons as long as he lives, if he apply for it up to a certain date, and pay a license to the

Government. I will only express my astonishment that such a proposal should be put forth, and add, that if this be the superior way of benefiting the public and *protecting the trade*, the more completely we are delivered from this protection the better.

One other recommendation remains, garnished with all the titles of liberality, etc., which is, Mr. Proctor says, to "ensure the hearty support of all concerned," and that is to admit to perfect equality with the present Pharmaceutist "everybody now exercising the calling." Will it meet with the "hearty support" of the 800 men who have been examined—who have, with industry and application, and at cost and inconvenience to themselves, won by examination the title they possess? One of them told us in a letter to the Journal, a few months ago, that the Council did not *dare* to set forth such a proposition, and that if it were thought to be seriously contemplated, it would raise a storm such as Bloomsbury Square had never known. Would it have the "hearty support of the public," who are calling for more protection from incompetency, to give the highest title (for, to have distinctions of grade or name is denounced as narrow, illiberal, etc.) to "every one who now exercises the calling," huckster or chandler-shop keeper though he may be? Would it ensure the hearty support of the medical profession, who have declared that it is one of the existing evils, which ought at once to be redressed, that there is no restriction upon the making up of medicine by any, however ignorant? And would it have the hearty support of the Legislature, which declared thirteen years ago that it was desirable that a title should be given to enable the public to distinguish the man entitled to their support, if we were to go back to the state of things in 1853, and give the very title it framed as a mark of distinction and honour, to every man who chooses to put up a blue bottle?

And what is the reason advanced for all this?—that there are some men outside of us who are equal to any among us. Certainly, men who cared so little about this equality which they now clamour for that they would not come amongst us when they were asked,—who have never spent a shilling to advance the education or promote the welfare of the youth who were coming forward in our business,—who, whilst the members of the Pharmaceutical Society, examined and unexamined, have spent thousands every year, not for themselves, but to find education and opportunities for improvement for the young Chemists throughout the country, have never troubled themselves to help, or have done all in their power to hinder or abuse. Truly, the charge of illiberality has very little foundation in the face of such facts as these, and the measure which is to ensure the hearty support of all is scarcely likely to be that recommended by Mr. Proctor.

Depend upon it, that if the Society were to yield to clamour, at the expense of consistency and justice, and to undo all that the last thirteen years has done, they would not only be promise-breakers to the public and their own examined members, but be looked upon with contempt by all who have entrusted them with administrative powers, and by none be more despised than by those who now charge them with exclusiveness and illiberality.

I am, Sir, yours faithfully,

OPIFEX.

FALSE ACCUSATION AGAINST A LOCAL SECRETARY OF THE PHARMACEUTICAL SOCIETY.

In the 'Chemist and Druggist' of February is an address from the Executive Committee of the United Society to the trade, in which certain charges are preferred against those who obtained the signatures of the trade to the declaration in favour of the Bill of the Pharmaceutical Society, of having made use of misrepresentations. The only instance, however, in which such charge is defined and authenticated, is that in which Mr. Hazeldine, who is at present the Mayor of Walsall, accuses our Local Secretary in that town of such unjustifiable conduct. Mr. Watkins has received the following letters in reply to his inquiries on the subject, and we publish them, as they completely exonerate him from the charge in those cases. He says he has received verbal replies to a similar effect from the three other individuals that were named.

Family Dispensing Establishment,
84 & 85, *Stafford Street, Walsall, March* 13, 1865.

Dear Sir,—In your note just received, I perceive you request answers to two questions:—

What misrepresentations were made to me to induce me to sign the memorial to the Pharmaceutical Society?—*Answer.* None whatever, that I am aware of.

Have I given sanction to the Local Secretary of the "Chemists and Druggists," to withdraw my name to the said memorial?—*Answer.* No, certainly not.

Your note gave me the first tidings respecting the existence of such a letter in the 'Chemist and Druggist,' and for myself I can safely say that the Local Secretary to the "Chemists and Druggists' Society" has never seen or spoken to me on the subject, nor I to him.

You are aware, from the conversation I had with you at the time I signed the memorial, that I am very anxious to become a member of the Pharmaceutical Society; but situated as I am, without an assistant, I am unable to leave my shop to go to London to pass an examination, or otherwise should have done so long ago, and I should esteem it a favour if you could suggest any other mode by which I could attain the fulfilment of my wish in this respect.

I am, dear Sir, yours truly,
HENRY J. SMITH.

Mr. G. H. Watkins.

Walsall, March, 13, 1865.

Dear Sir,—I am very much surprised to find a letter in the 'Chemist and Druggist' of February 15th, accusing you of misrepresentation in obtaining signatures to a memorial to the Council of the Pharmaceutical Society; as far as I am concerned, that letter is quite false. The *entire* facts are these:—You showed me the memorial, and merely asked "if I had any objection to sign." After looking at it I did so, most willingly.

I have known you for the last fifteen years as a straightforward, honourable, and truthful man, and am quite sure you can well afford to treat so base an attack with the contempt it deserves. In conclusion, I need scarcely add that I have *not* requested my name to be withdrawn from the memorial.

I am, dear Sir, yours very sincerely,
JOSEPH DAY.

To Mr. Watkins, Chemist, High Street.

You are at liberty to make what use you think fit of this letter.

PHARMACEUTICAL LEGISLATION.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The two Bills at last bid fair to become a subject of discussion by our Legislature, and must stand or fall, on their relative merits.

The acrimony which has hitherto prevailed is, I fear, likely to culminate in much bitterness, if the gross falsehoods and misrepresentations of a few individuals, arrogating to themselves the leadership of a body of men by whom they are viewed with the greatest contempt, are permitted to pass uncontradicted. I allude partly to the deputation of the United Society, and partly to the contents of its organ—if it is not still ashamed of the association—the 'Chemist and Druggist.'

First, then, Sir, in reference to the deputation. At the near approach of general election, we need not feel surprised at the number of M.P.'s lending their presence to this gathering, as we know that members are often urged by the bores of their constituencies into matters which are very distasteful to their ideas. The old tale was told, the same unblushing falsehoods were reiterated, as to the number of the trade, and the small proportion of the Pharmaceutical Society,—ignoring, as is always the case, the large number of examined men who have not become members of the Society, and the still larger numbers of registered apprentices. The duplicity of the Society was referred to, in obtaining signatures without the petitioners knowing the object of their prayer, and every ingenious method was taken to bias the Cabinet Minister. But will it avail? Decidedly not! These amateur legislators went a little too far—were all over-anxious to bray. Had they been content with the privilege of *entrée*, and deputed one or two of their body as spokesmen, they would not have divulged the weakness of their position.

The ridiculous admission of Mr. Slugg having signed both petitions, and pleading ignorance as to the contents of the one of the Council, is too absurd to entertain. The Bill has been before the trade now nearly twelve months, and he is not the man to neglect the perusal of so important a measure.

Mr. Wade follows with the same stereotyped harangue that we have been accustomed to hear since the formation of their Society,—implores Legislation, but deprecates Education. "Bother Latin, Botany, Materia Medica, Pharmacy, and Chemistry!" exclaims Mr. Wade,—"What do we want with them?" Do these gentlemen fear the responsibilities of examining candidates upon these subjects? or, do they view the future race of aspirants as boobies without brains or the hope of culture? Mr. Wade despises Latin, yet would aspire to the reading of prescriptions. This somewhat paradoxical expression is hard to conform with our present mode of procedure, unless he contemplates reducing the attainments of the medical profession, and to make converts of them, to "*Bother Latin*," and write in English! Is the chemist so thoroughly ignorant that there is not material in him to elevate to a professional status? Such is the presumptive conclusion to be gathered from the arguments of that gentleman.

The question of Medical Education is far from being settled, and there are many who consider a university degree as the *sine quâ non* of future admission into the medical profession. If so high an attainment is rendered essential to the qualification of a surgeon, surely the Pharmaceutical body must not retrograde, but bring up the future candidates to the standard of proficiency.

In the 'Standard' of to-day there is a leading article on the subject of Legislation, which will be read by all Pharmaceutists with considerable interest; it urges the adoption of the measure of our Council as the *only* means of elevating the trade. Police regulations for the sale of poisons can easily be enacted by a future measure. "*In the rage to do all at once there is great danger lest we end in doing nothing.*" Such is the conclusion of this excellent article.

Let me appeal then to the members of our body to exert themselves individually with their professional brethren, and not allow private jealousy to detract their usefulness; the Council have worked most indefatigably, and we must each support them in their noble endeavour to elevate the whole trade into a compact and legalized body. I fear that there is too much apathy amongst some of our

Local Secretaries; this is much to be regretted, as the aid afforded by an energetic Secretary is of the highest service to the Executive. Considerable benefits accrue in forming local associations, where the trade is brought together to discuss, in a social manner, questions relating to their profession and to the protection of their interests; scales of prices might thus be arranged, which, with honourable men, would lessen the evils of competition, which in the case of medicine is a practice much to be deprecated.

Let us remember how our great benefactor toiled for us; the honoured name of Jacob Bell must ever prove an incentive to us to persevere in the noble example he has set us; others, of the highest position in our profession, are still pushing forward our interests, and that of the whole body of the trade. Let this urge us on in the good work we have now commenced; with the encouragement of the medical profession, the public, and the press, we need not fear the clamour of men of no professional calibre, whose rise into notoriety has been simultaneous with that of the United Society.

I have never yet met with a non-member of our body who has not professed the greatest confidence in the Society, and their acknowledged right to the support of the entire trade. I am fully assured that they will be with us in our Parliamentary campaign; but we must organize a basis of operation that will defy the noisy and undignified mischief, promulgated by a mere fragment of jealous and officious malcontents.

I am, Sir, faithfully yours,

J. S. F. Richardson, F.C.S.

Leicester, March 21, 1865.

SALE OF POISONS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I wish to recommend to the attention of your readers, and of Chemists generally, the Report of the Edinburgh Committee on the "Question of Poisoning and the Means of Prevention," published in the March number of this journal. The subject has evidently been carefully studied, and the Report contains the most practical and common-sense view of the question I have yet seen published. They have undoubtedly fixed upon the true cause of all the *mistakes* in dispensing or retailing, when they say that "the source of the errors lies altogether in the mind of the wrong-doer;" for there can be no question that "a mistake as to the substance," or the supplying one article in place of another, arises entirely from what is called "absence of mind," and from the attention not being directed exclusively to the business in hand.

There are, however, one or two other causes which have not been noticed, and these are, first, the habit we all get into, more or less, of trusting to the physical appearance of the substance itself, or of the vessel in which it is contained, or the place in which it is usually kept, *instead of reading the label upon it.* I have no hesitation in saying that in every case where laudanum has been supplied instead of tincture of rhubarb, or any other dangerous article in place of a harmless one, the party doing it has *never read the label;* but the mind, being pre-occupied, the article is supplied mechanically, with the firm conviction that it is the right one. In this state of things no sandpaper, or diagonal, or perpendicular, or any other fanciful arrangement of labels, will ever be of any service, but the only remedy is to make it an invariable rule to *read the label* in every case before supplying the substance required.

Another cause is to be found in the alphabetical arrangement usually adopted in the shop and dispensary, whereby two substances nearly resembling each other in appearance stand close together,—the one possessing poisonous or dangerous properties, the other innocent; thus Tr. Rhei follows Tr. Opii; Liq. Am. Acet.; Liq. Ammon.; Pulv. Antim. Co., Pulv. Antim. Tart.; Pulv. Ipecac. Co., Pulv. Ipecac., and numerous other similar cases might be adduced; and in practice this is generally found to have been the arrangement of the bottles when any of these mistakes have occurred. The remedy for this is within reach of every one, for it is very easy so to arrange these different articles that the dangerous ones shall not occupy the same shelves as the harmless ones, but shall be placed amongst substances to which they have no resemblance. As to the laudanum itself, the safest plan is to put it at the end of a shelf away from the other tinctures, and where it can hardly be mistaken for anything else.

The poison-closet scheme, where all dangerous substances are to be kept under lock and key, appears to be abandoned by all whose opinion on the subject is of any value; and Dr. Taylor in his Report does not even mention it. This I am glad to see, for I believe that so far from being any safeguard, it would tend to increase the liability to error by bringing together substances which ought to be kept as far apart as possible, whilst use and habit would render people familiar with the poison closet and the arrangement of its contents, which would be handled just as mechanically as any innocent substance; besides, the state of mind in which mistakes are made would scarcely be affected by any such external influence. Moreover, in discussing the question of a poison closet, it ought to be remembered that it is as necessary to avoid mistaking strychnine for morphia, or arsenic for Antim. Tart., as it is to avoid taking any of these substances for an innocent one. Therefore, instead of locking them all up close together on two or three shelves, I believe it is a far safer plan to put them in different parts of the shop amongst substances as unlike them as possible, and as far apart as may be convenient; but when all this is done, do not forget the most important part—*to read the label.*

Yours truly,
W. WILKINSON.

Manchester, March 17.

IMPORTANCE OF THE APPOINTMENT OF LOCAL SECRETARIES.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—As the time for electing the Local Secretaries is approaching, it may perhaps not be out of place to suggest to those on whom the election devolves, that the men chosen to fill an office of some importance in the Society should neither be its lukewarm supporters nor persons whose sympathies are all with its active opponents. I would by no means advocate the extreme measures adopted in the United Society, where it would seem that the secretaries must hold "United" opinions on pain of "summary dismissal," but certainly at the present time, when the enemies of the Pharmaceutical Society are doing their utmost to destroy its influence in the trade and hinder its progress in every possible way, it behoves the members to select for its officers men who are devoted to its interests.

No one who has read the leading articles and the correspondence in the 'Chemist and Druggist,' and especially the address to the trade published in that Journal on the 15th July, purporting to emanate from the Executive Committee of the United Society, can fail to estimate at its true value the desire professed for unity of action between the Pharmaceutical Society and themselves; the language employed and the expressions made use of are quite sufficient evidence on *that* point.

It is mere idle talk on the part of the United Society to say that the Council of the Pharmaceutical Society prevent the joint action of the two, and that they contemptuously rejected a proposal to that effect made by the United Society; because, although some such proposal was made, it was made in such a manner that it could not be accepted, nor was it ever intended that it should be, for the parties making it were well aware that its acceptance would involve a speedy loss of their own importance as Executive Committee and officers of a Society they could no longer hope to keep in antagonism to the Pharmaceutical. The chemists and druggists generally know very well by whom their battles have been fought, and by whose influence many injurious measures have been defeated, and others modified so as not to interfere with legitimate business; they know by whose exertions more than one Medical Bill, which threatened to interfere seriously with their rights and privileges, was either withdrawn or amended; they know who, seven or eight years ago, were the means of defeating two or three successive Poison Bills; they know by whose exertions the Poisoned Grain Bill was at last brought into a satisfactory shape; they know by whose influence it is that they are not now subjected to the vexatious proceedings with respect to the sale of proprietary medicines and of spirit of wine, which were formerly so great an annoyance; and they know also, notwithstanding the boasting of the Executive Committee and its officers, that *they* were the means of preventing the Medical Bill being brought forward last year,—that in reality their influence in the matter was small indeed.

With regard to the Jury question, it could easily be proved that the Pharmaceutical Society sought exemption for the whole trade, and until it was found impossible, at that time, to obtain so large a measure, it was not sought for its own members only.

In conclusion, I would commend to those of our members who have "United" proclivities, to all who take an interest in the matter, a short course of 'Chemist and Druggist,' and after noting the remarkably *temperate* and *courteous* language generally used, and notably the address of the Executive in the February number, they will be able to judge how far the United Society—perhaps I should rather say the Executive Committee or its ruling spirit—desires harmonious action with the Pharmaceutical.

Yours, etc.,

March 20, 1863. A COUNTRY MEMBER.

NEW SYSTEM OF EXAMINATIONS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Dear Sir,—Will you, or any of your readers, kindly inform me with what works I must replace my Fownes, Bentley and Royle, in order to work up for the examination proposed in the new Bill introduced by Sir J. Shelley?—one of the influential deputation to Sir George Grey having informed that Minister "it would not demand a knowledge of Botany, Chemistry, or Materia Medica"!

Yours faithfully,

"MAJOR ASSOCIATE OF THE DOOMED SOCIETY."

London, March 23, 1865.

THE TWO MEASURES.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—It is greatly to be regretted that instead of the numerous meetings which have of late been held in various parts of the country, at each of which it has been a case of Pharmaceutical *versus* United Society, there could not have been some substantial effort made by which to reconcile rather than widen the differences which exist between the Bills of the two Societies, both of which we now find presented to Parliament, side by side; by which the strength of the whole cause becomes divided, each being deprived of that full and ample support which there is no question would have been given to a well-digested and harmonious Bill; whereas we find Sir George Grey, in receiving the deputation from the United Society, on Wednesday last, distinctly saying, "That he declined taking up our Bill, having the idea that it did not represent all sections of the trade." And yet, fully knowing that this must be the result of going blindfoldedly without recognising dangers which were open to the eyes of the most casual observer, we have allowed the time, with all its opportunities, to pass without coming to the point, which might easily have been accomplished had the interests of outsiders been more liberally dealt with.

Here we have the Pharmaceutical Society, with its excellent Laboratories, its able Professors, its Board of Examiners, its Charter, already recognised by Government, all things ready to hand to carry out in the most perfect manner the much-to-be-desired object; and yet failing in that most excellent gift "brotherly love," for the sake of a little petty jealousy absolutely cutting our own throats, and creating enemies where we should recognise brethren. Surely it is time to cast down these paltry feelings, and to show that we are not so narrow-minded or self-opinionated as to look with contempt upon others striving in the same cause although under a different banner.

I am, Sir, faithfully yours,

EDWIN B. VIZER.

63, *Lupus Street, Belgravia South, March* 17, 1865.

FIRE INSURANCE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Having had occasion a short time ago to make some inquiries respecting the rates of premium paid to Fire Insurance offices by chemists having working laboratories adjoining their houses of business, I was surprised to find that many not unfrequently perform operations which are distinctly forbidden in their policies.

The usual premium paid by such chemists is the doubly hazardous rate of 4*s.* 6*d.* per cent.; for this payment most offices will allow the laboratory to be used for all ordinary pharmaceutical operations, except the *distillation of ether*, and the refining of camphor and saltpetre. The only one of these exceptions which affects the retail chemist is that relating to the distillation of ether, which is an operation of frequent occurrence in the preparation of ethereal extracts, etc. It may be desirable therefore to remind those who perform this and similar operations, and who are insured on such terms as the above, that by so doing their policies become null and void; and although the wealthier offices might, and perhaps would, in the event of a fire, pay the amount insured, they would require the insurer to pay up the difference between the rate of premium he had been paying and a *special* higher rate, which they would consider he ought to have paid. On the other hand, some offices, having the power to do so, might refuse to pay anything.

It would appear that if laboratories are to be used for every purpose without restriction, a rate of premium from 7*s.* 6*d.* to 10*s.* per cent., according to circumstances, must be paid.

I may perhaps venture to remind all chemists who insure of the desirability of reading over their policies carefully, in order to understand clearly the nature of the agreement contained in them, so that there may be no risk of loss or litigation should a fire occur.

Yours respectfully,
M. CARTEIGHE.

172, *New Bond Street, W.*

DETECTION OF METHYLIC ALCOHOL IN PRESENCE OF ETHYLIC ALCOHOL AND VOLATILE OIL.

BY JOHN T. MILLER.

Of the tests for methylic alcohol hitherto proposed, none can be said to be altogether satisfactory. No great reliance can be placed on the indications of the potash test; methylated spirit may without much difficulty be so far "cleaned" as to be only slightly discoloured by caustic potash; and Eschwege's purified naphtha is merely tinged yellow by it after the lapse of some hours. Better results are obtainable by the use of sulphuric acid. When, for instance, a small quantity of the purified naphtha is mixed with an equal bulk of strong, colourless sulphuric acid contained in a test-tube, no immediate development of colour occurs; but upon treating the mixture—not however to boiling—it becomes of a deep red-brown colour. If *pure* spirit of wine is subjected to the same treatment, it remains colourless; but ordinary rectified spirit, owing to the trace of fusel oil it contains, shows a slight tinge of colour; while rectified spirit mixed with five or six per cent. of Eschwege's naphtha takes a light amber tint. Pure ether similarly treated continues colourless, but the methylated article turns brown. The necessity of removing all traces of volatile oil from the spirit to be examined is however a serious obstacle to the general use of this test. The above are not, properly speaking, tests for methylic alcohol, as the reactions are not due to that substance, but to other matters with which it is usually associated in the commercial wood-spirit; and in this respect they agree with the mercurial test of Mr. E. Reynolds, the action of which, according to that chemist, is owing to acetone.

The method which, after an extended trial, I have found to give good results, and to be capable of very general application, is based on the difference of the products of the oxidation, under certain conditions, of ethylic and methylic alcohol: the former yielding principally water, aldehyde, and acetic acid, with only traces of formic acid; the latter giving, together with other products, formic acid in *comparatively* large quantity. The following experiments demonstrate this:—

Put into a small distilling apparatus 60 grains of powdered bichromate of potash, and pour upon it 1 ounce of water and 90 grains of sulphuric acid, sp. gr. 1·845, then add 1 fluid drachm of rectified spirit. Let the mixture stand fifteen minutes, and distil 1 fluid ounce. Neutralize the distillate with carbonate of soda, boil it down nearly to dryness, add water to make up the quantity 4 fluid drachms, and render the solution sufficiently acid to redden litmus paper by the addition of a drop or so of acetic acid, then pour it in equal portions into two perfectly clean one-ounce test-tubes. To one portion add 1 grain of nitrate of silver dissolved in half a fluid drachm of water, heat to boiling, and boil *gently* for about two minutes. The mixture darkens slightly but does not lose its transparency, and if the tube is filled with water and set aside, a *minute* dark precipitate slowly subsides, leaving the glass clear and free from brown deposit. To the other portion of the solution half a fluid drachm of acetic acid, and a few drops of solution of nitrate of suboxide of mercury, are to be added. Upon boiling briskly for a few minutes, a *small* grey precipitate of metallic mercury subsides.

If these experiments are repeated, using pure methylic alcohol in place of rectified spirit, very different results are obtained. The portion of the prepared distillate treated with nitrate of silver quickly becomes turbid and opaque when treated, and upon boiling *a coating of silver sufficiently thick to form a mirror is deposited on the inner surface of the tube.* If the liquor is transferred to a clean tube and again boiled with another grain of nitrate of silver, a part of this is also decomposed; and on adding water a *considerable* precipitate of silver subsides, and a thin film of the metal, which appears *brown* by transmitted light, is found upon the glasss. Upon boiling the second half of the distillate, after adding acetic acid and solution of subnitrate of mercury, fresh portions of the latter being supplied as long as it is quickly decomposed, an *abundant* precipitate of metallic mercury separates.

In mixtures of ethylic and methylic alcohol the detection of the latter by this process is easy and certain, for when it forms only from 1 to 2 per cent. of the whole, the distillate, upon treating with nitrate of silver, darkens to opacity, and distinctly *browns* the tube. Of course the spirit to be tested must be free from non-volatile organic substances; but the presence of essential oil in small quantity is of no moment. Consequently, in applying the method to the examination of tinctures, etc., a preliminary distillation is often necessary. This, however, is a trifling matter; and for the use of those who may require such information, I will briefly describe the simple arrangements which have enabled me to perform these small distillations with ease and dispatch. In Fig. 1, *a* is a two-ounce flask, to which is fitted by means of a sound perforated cork the glass tube, *b*. This tube is about a third of an inch in the bore, and rises two inches above the neck of the flask. Its descending limb, *c*, is connected with another two-ounce flask, *d*, which is immersed to the neck in a vessel of cold water. The dish, *e*, contains water, which is drawn off by a piece of lamp-wick, and deposited by drops on the tube, *c*, round which is rolled a slip of blotting-paper, thus forming an effectual condenser. The most convenient lamp is an argand burner with iron chimney, on the top of which fits a cap having a hole in its centre about the size of a shilling. Fig. 2 represents an ounce flask connected with a test-tube receiver. It may be held by a tube-clip, and is useful for distilling small quantities of spirit from tinctures, etc.

Supposing, then, it is required to test, say Tinct. Benzoin. Co. for methylic alcohol: introduce a drachm or two into the flask, wrap some wet blotting-paper round the test-tube, apply heat, and in a few minutes the first operation is finished. Now put into the flask, *a* (Fig. 2), 30 grains of bichromate of potash in powder, add half an ounce of water with 25 minims of strong sulphuric acid, and then half a fluid drachm of the spirit. Allow the mixture to stand fifteen minutes, and distil half a fluid ounce. Add to the distillate a very slight excess of carbonate of soda, boil it down to two fluid drachms, and add enough acetic acid to impart a *distinct though feeble* acid reaction; then pour it into a test-tube, and after adding a grain of nitrate of silver dissolved in half a drachm of water, boil *very gently* for about two minutes. If the liquor merely darkens a little, but continues quite translucent, the spirit is free from methyl; but if it becomes muddy and opaque, and the tube after being rinsed and filled with water appears *browned* (best seen by holding it against white paper), the spirit is methylated. In the cases of tinctures prepared with proof spirit, about 50 minims of the distillate should be taken for oxidation. A preparatory distillation is not always needful. Spt. Ammon. Aromat. only requires neutralizing with sulphuric acid, and filtering from the sulphate of ammonia. Strong solutions of essential oil, as some of the "spirits" of the Pharmacopœia, may be diluted with 7 parts of water, shaken with magnesia, and filtered. About $4\frac{1}{2}$ fluid drachms of the filtrate, mixed with the sulphuric acid, are then added to the bichromate of potash, and the process completed as before.

"Few articles of the Pharmacopœia are more extensively adulterated than spirit of nitric ether," says Pereira; and certainly matters have not improved since the introduction of methylated spirit.

Shake the sample to be tested with ignited carbonate of potash, let it stand an hour, distil the small quantity required, and proceed as before. When the preparation is pure the results are similar to those given by rectified spirit; the darkening of the solution goes rather further however, but stops far short of opacity, and the tube is not perceptibly stained. The difference of the results in the case of the methylated article is strongly marked; the liquor quickly blackens on heating, and the browning of the tube is very distinct.

Of twenty-three samples of spirit of nitrous ether procured from various sources and examined by this method, thirteen gave satisfactory indications of the presence of methylic alcohol. A careful examination of the odour and flavour of each sample preceded the chemical one, and it was found on comparing the two sets of results that the accordance, though not complete, was remarkably close.

Sheffield, March, 1865.

THE NEW LIGHT.

BY MR. W. WILLMOTT.

Great things are in progress. Not the least among the many new phenomena now attracting the attention of the scientific world, is the magnesium light; and it is encouraging to note that this discovery, for such it must be called, is surrounded by conditions of so promising a character, that very sanguine expectations are formed respecting the extent to which it may be made available for purposes of general adoption. Already has the magnesium light found its way into the drawing-room, dazzling the eyes of all beholders, and competing with the "odorator" as a pretty, though scientific amusement, for the largest share of public favour. The "wire" has an extensive sale, and is familiar to most youths who delight in astonishing their friends with the effects they can produce by the aid of a well-filled chemical chest and a little handbook of experiments for a guide. But during this while, earnest and thoughtful men are zealously applying themselves to the task of discovering the whole truth in connection with this new illuminating material. Following up the researches and discoveries of Sir H. Davy, they are developing the peculiar character of the metal to its fullest extent. What may be the result as science progresses, we are not at present in a position to decide. With the experience of oxycalcium ignition before us, it seems easy to predict for any light produced under somewhat similar conditions, a like undignified fate. Most of us have heard of the Lime Light Company, and many of us have seen its brilliant rays and dark shadows thrown across the old bridge at Westminster. Where is this company now? and what progress has it made towards the accomplishment of those grand schemes originally propounded by its too sanguine promoters? But in truth the lime and magnesium lights though in some respects the same, are yet widely different. A stream of mixed gases (oxygen and hydrogen) is ignited and thrown upon a piece of lime; so intense is the heat, that the particles of lime become incandescent, and by a correlation of the physical forces, produce the phenomenon that is then witnessed. Not exactly so in the other case. Here is a piece of pure, or nearly pure metal, rapidly oxidized (burned) in the air, the combustion supplying its own conditions until something occurs to interfere with the process of oxidation. In this process magnesium is converted into magnesia, and then, but not till then, the resemblance to the lime light commences. The particles of magnesia become incandescent and intensely white and dazzling. By virtue of a power which they possess of being incapable of fusion, the heat is rejected as it were, and thrown out into the atmosphere in all directions; not indeed *as* heat, but transformed as if by magic into rays of great brightness and splendour. A light is produced, which greatly resembles daylight, and which shows all surrounding objects in their natural and true colours. In the difference, then, here pointed out between the two lights, we observe a loophole of escape from some at least of the objections that have been urged against this mode of lighting for purposes of ordinary combustion. All cumbrous machinery is done away with, and the whole process is entirely free from danger. A parabolic or spheroid reflector will send the light to a great distance in any direction, whilst a properly constructed lamp, without this addition, will modify and assist its general diffusiveness.

In estimating, however, the probabilities of success as regards the introduction of magnesium for illuminating our public buildings, offices, and shops, two main points are open for consideration,—the character or quality of the light itself, and the cost incurred in its production. In the combustion of all hydro-carbons, such as coal gas, the products evolved are, for the most part carbonic acid and water, and these mingle with the atmosphere and pass off unperceived. The body oxidized is carbon, the result being a light of a soft yellow tinge, which can be looked at and examined by the eye without difficulty. The light is also clear and bright under proper management, and in the case of a common candle or lamp is both portable and safe. These qualities render this mode of lighting admirably adapted for ordinary use; but there are objections nevertheless, which it would be well if possible to get rid of.*

In "ignition without combustion" we meet with a totally different result. Here the intensity is very great, the actinic or chemical ray being considered, in the case of magnesium, equal to that of daylight. Everything upon which the light falls is brilliantly illuminated, the reflection from white surfaces being correspondingly great—a matter of considerable importance, since there cannot be a doubt, that much injury is done to the eye when reading or working by the aid of an unsteady or indifferent light. It would not be difficult in the former case to regulate or lessen the intensity, if required, but we all know how difficult, or rather how practically impossible it is, to *brighten* a flame issuing from a gas jet or common candle beyond its light-giving pover. But it is objected, that whilst lights "in which carbon constitutes the ignitable solid," possess a power of diffusibility, which renders objects not directly opposed to the course of the rays more or less distinctly visible, "the electric, lime, and magnesium lights possess none of this diffusiveness; their rays seem to be projected with a force and velocity which deprives them of the power of diffusion. An object placed in the direct course of the rays is splendidly illuminated, and the rays are projected to an immense distance; but the shadows cast by intervening objects are intensely black, and the rays seem to pass through the atmosphere without producing much effect except upon that part which is in the course of the stream of light." And herein would appear to reside the supposed cause of failure in the application of this light to ordinary illumination. "It is in no wise suitable to such a use." Experiments, however, would seem to place *magnesium* in an exceptional position. Newspapers and books have been placed between the eye

* The means of testing the illuminating power and chemical purity of coal-gas, and the various methods adopted for measuring or determining the relative intensity of two lights, are given by Dr. Letheby in a very able lecture, published in the 'Medical Times and Gazette,' February 11th, 1865.

and the light, and at a considerable distance from it, and yet have been read with great facility; in fact, by modifying and improving the process (which time will probably show to be quite practicable), there is no valid reason why we should not make this light subservient to ordinary use, and, whilst retaining its remarkable qualities, render it unobjectionable in all other respects. At present, it must be said, that the question of cost is a formidable obstacle in the way. It is well known that magnesium is extracted from its various sources with great difficulty; but, like other metals of the same class, it will, no doubt, be more abundantly obtained as time progresses. With such men as Mr. Sonstadt pursuing the investigation *con amore*, we feel almost assured of a satisfactory result.* But not alone upon a liberal production of the metal does the cost depend. Mr. Alonzo Grant, who has been zealously engaged on the subject, and writes a letter to the 'Standard,' December 1st, 1864, states that by burning a strip of zinc in conjunction with two strips of magnesium, the cost of the light may be reduced by two-thirds; and further ventures to predict that "magnesium will become as cheap as zinc, and that in course of time it will be possible to illuminate a street a mile long at the rate of a halfpenny per hour." A gentleman with whom I am personally acquainted, and who has instituted some very able experiments, and been in communication with both Mr. Sonstadt and Mr. Grant, informs me that these discoverers—for such, indeed, they are, with the distinctive deference due to each—are still labouring assiduously to bring this light to something like practical perfection; and, until the result of their labours shall be made known, it would scarcely be wise to pronounce an opinion to the effect that *signalling* and *photography* will alone be benefited by it. We are quite prepared to hear of a newly-discovered *amalgam* that shall be found to burn brightly and economically, or of a lamp so constructed as to answer the same end. With regard to the dark shadows, if they "come like shadows," so they must "depart." The question of cost once settled, and the rest will scarcely fail to follow in due course.

The history of artificial illumination acquires a peculiar interest at the present time, from the fact that we are by no means satisfied with what we have already achieved, but are branching out in all directions in search of some new discovery which shall be found to obviate the inconvenience attending the method at present adopted. "More light, we want more light!" is the cry of the age, and it may be taken in its *double sense* with a great amount of truth. The papers teem with complaints of the indifferent quality and high price of the gas supplied by the various gas companies, and no one, of course, will consent to go back to the age of "dips" and "short sixteens." Just now we are looking very wistfully at petroleum. The oil wells of Venango county, Western Pennsylvania, are apparently inexhaustible, and the demand is correspondingly great. Petroleum, it is said, has extinguished every light in America but that obtained from coal gas, and with this it is entering fiercely into competition. The exports to this country are immensely on the increase, and there can be no doubt that in petroleum we shall possess a very valuable illuminating agent. But petroleum has nothing in common with magnesium, and it is to this latter body that we are looking to change the entire character of our artificial light. Magnesium belongs to a group of metals which have their source in the alkaline earths. It is extremely oxidizable, and when exposed to the atmosphere it soon becomes coated with magnesia, its only oxide. It is seldom to be met with quite pure, owing to the presence of a small quantity of nitrogen, which darkens

* Magnesium is now being manufactured upon a commercial scale, by an undertaking called the Magnesium Metal Company, and Messrs. Johnson, Matthey and Co., the metallurgists of Hatton Garden, have, as sole agents, undertaken its introduction. ('Times,' Monday, February 20th, 1865.)

the outer surface, but does not interfere with its properties in other respects. Magnesium may be obtained from the salts of magnesia and from the magnesian limestone, but its extraction in bulk is attended with considerable labour. In truth it cannot be denied that, looking at the question of magnesium illumination as a whole, there are difficulties which we do not quite see our way out of at present. But, remembering the rapid progress that has already been made, we look forward with something like confidence to ultimate success. Coal gas, when introduced, was a great step in advance; but such is the brilliancy and magnificence of magnesium, that should it ever be made to form an efficient substitute, it will constitute one of the most splendid and important discoveries of this marvellous and progressive age.

27, *Bishopsgate Street Within*, *February* 23, 1865.

MYSTERIOUS DEATH CAUSED BY CRIMINAL SUBSTITUTION OF CORROSIVE SUBLIMATE FOR STEEDMAN'S POWDER.

On the 1st of March, 1865, an inquest was concluded before J. Wybrants, Esq., M.D., coroner for the Eastern Division of the county of Somerset, at Emborough, a small village situated between the cities of Bath and Wells, and about six miles from Shepton Mallet, on the body of William Coles, an infant, seven months old, who mysteriously came by his death through poison.

It appeared that at the beginning of January the mother of the child procured a packet of Steedman's Powders from Mr. Habgood, a chemist, at Wells, one of which was given, to the great relief of the child, who was a little ailing. A month afterwards, the mother, who had not seen the first powder administered, and consequently did not know what it was like, mixed a second one in some moist sugar, which was administered by the little nursemaid, and killed the child in ten minutes. This led to the examination of the remaining powders, when it was found, of the six left in the packet five were in their normal condition, but from the sixth paper the original powder had been removed, and about ten grains of corrosive sublimate substituted. On a *post-mortem* examination by Mr. Cartner, of Oakhill, the same substance was found in the child's mouth; so that there could be no doubt of what had caused its death.

The natural and first impression was, that some mistake had been made in the factory of the proprietor of Steedman's Powders, but the evidence of Mr. Faulconer, the manufacturer of the medicine, completely set aside the idea of such a possibility; while that of Mr. White, managing clerk of Messrs. Barclay & Son, also of Mr. Habgood, the chemist, of Wells, who supplied the packet, and the messenger who fetched it for Mrs. Coles, proved that the packet had not been tampered with.

Mr. Charles Coles, the father of the child, kept corrosive sublimate, in lump, for the pupose of touching the sores of sheep infected with "the fly," and a lump which had been used for that purpose was kept wrapped up in a drawer of a bureau in his sitting-room, which drawer was not kept locked, so that the contents were accessible to any one besides himself. This sublimate, as well as the packet of Steedman's Powder, was taken possession of by the police, and a portion of it, as well as a portion of the false Steedman's Powder, properly labelled, were handed over to Dr. Wybrants, the coroner, for microscopic analysis, and, at the request of Mr. Faulconer, were submitted for examination to Mr. Henry Deane, whose evidence we now give.

Mr. Henry Deane, a microscopical analyst, from London, said:—"I am a member of the Pharmaceutical Society, one of the council, and an examiner of that society. I have very carefully examined the contents of the two packets given me by the coroner. One packet was marked 'Corrosive Sublimate' and the other 'Steedman's Powder.' That marked 'Steedman's Powder' is not so, but is corrosive sublimate, and exactly corresponds with the packet so marked. On examination with the microscope, I find the crystals in both papers soiled and stained in a peculiar manner, and both containing particles of hair or wool and other fibrous matter, all much rubbed. The two packets corresponded entirely (except in the disintegration of the crystals, which were much finer in the Steedman's Powder paper)."

Here the jury had an opportunity of examining these powders, under the microscope, and were also shown some sublimate in a clean state, as it would, in all probability, be sold by a druggist.

Examination continued:—"I have examined the powder marked 'Corrosive Sublimate.' It is in my opinion exactly the same as that marked 'Steedman's Powder.' I see no real difference in them; they are both soiled and stained alike, and contain similar fibrous particles. I have examined the two packets in the hands of the policeman. They both present the same appearance, and are precisely like those I received from the coroner. I received the powders from the coroner this morning, and tested them in his presence before bringing them here. By a juror: It was necessary to test them before bringing them here. I don't think it probable corrosive sublimate would get solid in coming from a chemist's shop. It is usually carefully wrapped up, sealed, and labelled. When I have had occasion to sell it, I have invariably sealed it. Chemists are generally very careful in the sale of it. The character of the extraneous matter is similar in both powders. I do not think there was any difference in the quality of the two powders. I am satisfied as to the identity of the dirt. I have had much experience in microscopic science during twenty-three years' practice, both on my own account and that of professional men. It requires considerable practice in the study to avoid fallacies. The particles of wool seemed to be broken up and ragged at the ends in both packets. There was no essential difference between the two."

The whole of the evidence that could be brought to bear on the case having been gone through, the learned coroner proceeded to sum up. He said, from the evidence adduced at the first inquest, he thought perhaps the child had died in a fit, and he laughed at the idea of its being stated that death was caused by taking Steedman's Powders, having known them for a number of years, and the good effects they produced on children; but when the powder was produced, he immediately discovered that it was poison, which was attested to by the medical gentlemen, and had been so again that day. From the evidence adduced, there was no doubt what had caused the child's death. It had been proved by the mother, by Ham, a person present when the powder was given, by the servant-maid, and by the niece, that the child took a powder, and that it was dead in ten minutes; and from the evidence of Mr. Cartner, the medical attendant, there was no doubt that the powder was a deadly poison—corrosive sublimate—from which the child died, and which was administered by the little maid. Now the question arises, how did that powder get there? That was a mystery. The evidence showed that the Wells druggist, Mr. Habgood, sent the packet of powders by Ann House to Mrs. Coles, and that it was delivered secure and unopened. Mrs. Coles broke the seal and opened the packet, and the first powder was given, which seemed to have been harmless and did good. But on the 8th of February, when the second powder was given, the child was dead in ten minutes. They had had before them a gentleman from London, representing a wholesale agent for these powders, as well as other patent medicines, who testified to their extensive sale and to their harmless and beneficial effects. There was the evidence of another gentleman from London—Mr. Faulconer, who had come forward most willingly, and by so doing was the means of saving him (the coroner) much trouble, and the county much expense, from whom we learn that from the nature of his arrangements it was impossible the poison could have been inserted in his establishment; if so, there would have been death all over the country.

From the evidence, then, of Mr. Habgood and the wholesale dealer, there appears to have been an impossibility for poison to have been introduced into the powders while in their possession. They must, therefore, be freed from any charge whatever, and, if the evidence of Mr. Faulconer was to be believed, he could not be held to blame.

There was no doubt in his (the coroner's) mind that a murder had been committed, by the substitution of corrosive sublimate for the real powder, and he could not rid his mind of the fact. He believed that some evil-disposed person towards the child had placed the poison there in the baby's medicine-cupboard, not to kill Mr. or Mrs. Coles, but *to destroy the child.*

The powders were purchased, and when delivered at that house they were sealed with the government stamp around them. How did this powder come there? That mystery they could not unravel. Mr. Coles had told them of whom he purchased the mercury, and where he placed it—in the bureau—a portion of which the shepherd had. Now it appears the shepherd lost his piece through a hole in his pocket; and it is most remarkable that the poison the child died of was similar to that the shepherd lost. The evidence of Mr. Deane, the analyst, whom he (the coroner) had no idea of bringing before them but for the purpose of endeavouring to unravel the mystery, showed that both powders were of the same nature, and there was no doubt that the poison had been substituted for the original powder, for the purpose of killing the unfortunate deceased. What, then, could have been the object of this crime? This was the only child out of six the parents had been able to save, and they must have been most anxious that it should live. If any one was at enmity with the parents, and, to vent their malice on them, took these means, then there would appear to be some cause for the mystery. But there seemed to be no one with whom the parents were not on friendly terms, and there appeared to be no motive for the act. Mr. and Mrs. Coles were greatly to be pitied, not only for the loss of their only child, but for that most unpleasant inquiry. If they thought, by adjourning again, more light could be brought to bear upon the subject, he was most willing to do so; but under present circumstances an open verdict must be given.

The jury were then left to themselves, and after the space of nearly an hour, returned the following verdict:—

"By what means the said William Coles came to his death, the jury upon their oath say, some person or persons unknown did feloniously, wilfully, and of malice aforethought, kill and murder the said William Coles, by a substitution of corrosive sublimate for Steedman's Soothing Powder."

THE EFFECTS OF THE CALABAR-BEAN AS AN ANTIDOTE TO POISONING BY ATROPIA.

In the ophthalmic department of the hospital at Prague last August, four boys, engaged in cleaning the room, drank a portion of a solution of atropia, thinking that it contained spirits. Two of the boys either spat out or vomited the fluid, and exhibited no symptoms of poisoning, but the two others who did not vomit were distinctly poisoned —one, however, much more so than the other. The symptoms were those of poisoning by belladonna, and consisted of delirium, dilatation of the pupils, feeble pulse, and in one there was coma, alternating with furious delirium. Both the patients were taken to bed, one of them being restrained in a strait-jacket, and cold lotions were placed on their heads. Dr. Kleinwächter happened accidentally to have with him a solution of the Calabar-bean extract in glycerine, and, by way of experiment, he gave to the patient who was the most affected ten drops of the solution (six grains of extract to one drachm of glycerine), which in about a quarter of an hour produced violent vomiting. The pulse became stronger and quicker, rose to 75 and then to 80 in the minute, the temperature of the body fell, the delirium abated, the patient became more quiet, consciousness returned, urine was passed with some pain in the urethra, and the pupils became somewhat contracted. In the case of the other patient, who was less affected, some of the extract of the Calabar-bean was dropped into the eye, but without any good effect, for on the next day the symptoms were almost unchanged, while the patient who had taken the solution of the Calabar-bean internally, had almost completely recovered. The rapid and striking improvement in one of these cases appears manifestly to be attributable to the administration of the Calabar-bean extract, for the patient who was not treated in the same manner showed no improvement for forty-eight hours.—*Berliner Klinische Wochenschrift* and *British and Foreign Medico-Chirurgical Review.*

ON THE CITRINE OINTMENT OF THE BRITISH PHARMACOPŒIA.

BY M. DONOVAN, M.R.I.A., ETC.

There is no known formula for preparing citrine ointment which will always present the same appearance and possess the same properties, and a very short time is adequate to induce changes to a certain amount. This ointment may be viewed as a metallic soap mixed with that compound which Fourcroy designates oxygenized pomatum.

Oxide of mercury, like other metallic oxides, forms a soap with the fatty acids. Berthollet produced such a compound by decomposing corrosive sublimate by means of solution of soap; but it was not permanent, in process of time it became slate-coloured. A soap may be formed of an analogous constitution by heating finely-levigated peroxide of mercury with lard; but the soap thus produced undergoes the same changes as that of Berthollet, first becoming brown, and ultimately slate-coloured. Hence, the ointment of red precipitate cannot be kept unchanged in the apothecary's shop. Citrine ointment is similarly acted on by time; if its colour be ever so bright a yellow at first, it soon becomes dull, and by degrees tends to the same alterations as those already mentioned.

These changes are induced by the gradual decomposition of the mercurial nitrate and evolution of the oxide. If the decomposition be assisted by heat, the oxide is not only evolved but decomposed, and vapour of mercury is freely discharged.

Citrine ointment is of French origin. It was first introduced at the Hôtel Dieu, where it was employed for the cure of itch—a disease which raged there ruthlessly at the time. The basis of it was lard, with one pound of which an ounce of mercury dissolved in nitric acid was incorporated; it was found very effectual. This is the same formula that was introduced into the Dublin Pharmacopœia of 1807; but it was so hard that it could not be mixed with other ointments so as to be smooth, without the greatest trouble, and melting could not be used without changing its chemical constitution. With a view of remedying this defect, the Colleges introduced oil, forgetting that nitrate of mercury solidifies olive-oil, and renders it even hard. Changes in the ratio of nitric acid, in its strength, in the temperature at which the solution of the mercury was effected, and at which the solution was presented to the fatty matter, were made, but failed in attaining and preserving the qualities required.

I believe that the following is the theory of these changes. As there are two oxides of mercury, so there are two nitrates, which by certain agencies becomes basic. When mercury is dissolved in nitric acid in the ratio directed by the Colleges, the solution will be found to contain both the protoxide and peroxide, one or other predominating, according to the temperature at which the solution was affected. The two salts soon separate; the protonitrate crystallizes, the pernitrate remains in solution, retaining, however, a little of the former. If either of these nitrates, or its solution, be mixed gradually with water, its basic salt will sooner or later be precipitated: sooner, the less free acid it contains; later, as it contains much; but in every case the basic salt at length will be precipitated. If the protonitrate had been decomposed by a small quantity of water, the resulting basic salt will be white; if by a large quantity, yellow; if by a large quantity of boiling water, it will be bluish dark-grey. These degrees of colour are due to the abstraction of successive quantities of acid. If pernitrate be decomposed by cold water, it affords an orange-brown salt; but according to Thenard and others, if much boiling water be used, the whole acid is washed away and leaves pure red oxide.

Much the same series of changes may be observed when, instead of water, the mercurial nitrates are exposed to the action of the fatty acids; but owing to the considerable excess of strong nitric acid and the high temperature present, additional phenomena are induced. When the nitric acid holding the mercurial salts in solution is mixed with the melted fatty matter, the chemical action induced is first to form Fourcroy's pomatum; the uncombined acid is withdrawn by decomposition, and the basic mercurial salts, which are now yellow, communicate that colour to the ointment. But the decomposition of the basic salts does not stop here; the abstraction of nitric acid still slowly continues, until at length the mercurial salts are resolved into the two original oxides—slate-grey and orange-red—by the admixture of which colours an ointmdnt of a brownish hue, lighter or deeper according to age and circumstances, will result. Heat will bring about these changes more rapidly; without heat a very long time will be required.

This series of changes took place in a remarkable manner when I repeated the process of the British Pharmacopœia for making citrine ointment. When the hot mercurial solution was poured into the hot lard and oil, and well stirred, an effervescence was excited which would soon have overflowed but that the vessel was capable (as the Pharmacopœia directs) of containing six times the volume of the ointment. During this violent effervescence the colour of the liquid ointment became continually darker, until, the effervescence having ceased, the ointment was found to be of a dark mahogany colour. When perfectly cold, it did not solidify, but remained of the consistence of treacle, and might be poured from one vessel to another. The bottom of the basin in which it was made was found to be lined with a dark slate-coloured powder, which proved to be reduced mercury. In four months after, the ointment had attained the consistence of fresh butter in the hot days of summer.

Thus the process of the British Pharmacopœia is liable to failure. From all the experiments I have made, and they have been numerous, and varied according to the instructions of the three Colleges, I am led to believe that the degree of chemical action, as evidenced by the activity of the effervescence when the ingredients are mixed, is the main point to be attended to. If the ingredients be mixed cold, and the temperature maintained at a low degree, the ointment will be hard and of a pale yellow hue. If the ingredients be mixed very hot, and the temperature allowed to rise with the chemical action, the resulting ointment will be brown and too soft. Intermediate temperatures will produce intermediate colours and degrees of hardness, from impracticable solidity to absolute liquidity.

Besides colour and consistence, there is another quality to be attended to. When the chemical action has been feeble the ointment produced will be acrid and irritating, as well as hard and pale. A portion of this kind of ointment, which to the taste was very acrid when newly made, became in a few weeks much less so; in three months it was no longer acrid but metallic in taste. The frequent occurrence of this acridity induced surgeons to prescribe the ointment in a state of dilution with lard or other ointments, so that it is now almost never otherwise prescribed than diluted. Would it not be better to reduce the strength of the ointment in the formula of the Pharmacopœia to one-half, and thus put an end to the necessity of diluting it? The dilute citrine ointment, as directed in prescriptions, has no definite meaning as to strength, and the difficulty of preparing it is a continual source of annoyance to the apothecary.

I fear it is impracticable to obtain a citrine ointment which, at its first production, shall always present the same appearance and possess the same qualities by any process which does not carry into effect the following particulars, viz. the temperature at which the mercurial solution and the fatty matters *respectively* are to be mixed and, by art, *maintained;* the relative quantities of each of the ingredients, and the absolute quantity of the whole, which is not to be varied, for much depends on this. Were all this accomplished, the ointment would still be liable to subsequent changes, during which its medical effects must alter. So that it is probably hopeless to expect an unexceptionable process for obtaining a permanent ointment, containing nitrate of mercury in any of its forms. It might be supposed that the most prudent way to proceed would be to prepare only small quantities at a time; but here again we are met by the possible acridity of the new ointment. Dr. Duncan's process, from which he expected so much, does not obviate the difficulties in question.

A Dublin apothecary, nearly a century ago, acquired great fame for making a citrine ointment which remained apparently unchanged during a long time, and was soft from the beginning. It was known that the basis was butter. I have tried it, but found it acrid for a very long time.—*Dublin Medical Press.*

MAGNESIUM: ITS PREPARATION AND PROPERTIES.

BY EMERSON J. REYNOLDS, F.R.G.S., LECTURER ON PRACTICAL CHEMISTRY, LEDWICH SCHOOL OF MEDICINE AND SURGERY, DUBLIN.

Little more than five years have now elapsed since two distinguished chemists and physicists, Professors Bunsen and Roscoe, while engaged in some photo-chemical researches, observed the high refrangibility of the light emitted by burning magnesium-wire, and also its great "actinic" power; these observations led them to propose it as a convenient source of light for photographic purposes. It is but recently that any attempt has been made to utilize the valuable hint thus thrown out; this has not been due to apathy or neglect, but principally in consequence of the difficulties in the way of obtaining the metal in sufficient quantities for commercial purposes. The first steps towards the simplification of the manufacture of this metal we owe to the researches of Bunsen and Matthiessen; but to St. Clair Deville and Caron is due the productive process at present in use in this country under a patent granted to Mr. Sonstadt, of Manchester, a gentleman to whom great praise must be awarded for the energy and perseverance with which he has overcome the difficulties which lay in the way of the preparation of magnesium on a large scale. At the present time, when so many are engaged in discussing the value and best modes of applying the magnesium light to photographic purposes, it may be of interest to give a succinct account of the preparation and properties of this remarkable metal in so far as they may be of interest to our readers.

The process of manufacturing magnesium may be most conveniently described as consisting of three stages:—1. The preparation of chloride of magnesium. 2. The reduction of the metal. And 3. Purification by distillation. Each of these operations will now be considered separately.

I.—*Preparation of Chloride of Magnesium.*

The manufacture of chloride of magnesium is far from being so simple as it would seem to be. It is true that it is very easy to obtain it in solution by dissolving magnesia, or its carbonate, as commonly sold, in hydrochloric acid; but if we evaporate this solution to dryness in order to obtain the salt in the solid state, we find that as the last portions of water are being given off they decompose some of the chloride, thereby reforming magnesia and setting free hydrochloric acid, consequently the residue left by evaporation contains a considerable amount of infusible magnesia. This difficulty, however, is well known to be overcome by the addition of either common salt or the chlorides of potassium or ammonium to the solution of chloride of magnesium; no decomposition, then, occurs on rapidly evaporating the solution to dryness, in consequence of the formation of a stable and fusible double chloride of magnesium with chloride of sodium, potassium, or ammonium, as the case may be. This fact has been taken advantage of by Deville and Caron and by Sonstadt.

Mr. Sonstadt, in the specification of his patent (dated November 8th, 1862), when describing his mode of manufacturing chloride of magnesium, lays particular stress on the necessity for excluding all traces of sulphuric acid. The reason for particularity in this respect is, that the sodium used afterwards for reducing magnesium from the chloride would likewise take away oxygen from the sulphuric acid, thereby giving rise to the production of sulphides, which are found to materially hinder the aggregation of the small globules of reduced magnesium. Mr. Sonstadt preferably uses chloride of potassium for adding to the solution of the chloride of magnesium prepared as already mentioned. The compound solution is then evaporated to dryness, and the solid residue placed in a platinum crucible of sufficient size; heat is then applied until the salt has perfectly melted, and any particles of infusible matter have had time to subside. The fused salt is poured out carefully on an iron plate; it quickly solidifies, and should then be broken up and preserved in stoppered bottles until required for use in the subsequent steps of the process.

Before leaving the consideration of the first part of the process, we may quote the following words from Mr. Sonstadt's specification, as they convey a hint to our readers regarding the selection of specimens of magnesium wire:—"When the material from which magnesium is to be prepared contains ammonium, in whatever state of combination, the metal obtained from it invariably contains nitrogen, the presence of which causes the magnesium to have a yellow colour, and to tarnish rapidly in the atmosphere." It might be added to this that the regularity of combustion of even thin wire seems to be decidedly interfered with by the same circumstance.

II.—*The Reduction of Magnesium from its Chloride.*

The magnesium now manufactured on the large scale is almost exclusively obtained by the action of metallic sodium on the chloride of magnesium; or, what amounts to the same, of the double salt previously referred to. There are, however, other modes of reducing the chloride, the most interesting and simple of which will be hereafter described. In order to obtain magnesium with the aid of sodium, one part of the latter, cut into small pieces, is placed in an iron crucible, and covered with five parts of the double chloride of magnesium and potassium; the cover of the crucible is now put on, and the temperature of the whole rapidly raised to full redness. When the heat has been continued for a sufficient length of time, the crucible is allowed to cool, and when perfectly cold the cover is removed and the contents extracted. The mass is now quickly washed with water, which dissolves the saline matter, and leaves the reduced magnesium in the form of small globules more or less adherent to each other. The drying of the washed metal must be accomplished as rapidly as possible, at a temperature not higher than the boiling-point of water.

Another mode of producing magnesium has already been referred to. This consists in employing the decomposing power of the galvanic current. This mode of reducing magnesium was first successfully employed by Bunsen; but the following instructive and simple experiment is due to Matthiessen:—Take a common clay tobacco pipe with a bowl nearly globular in shape. In the cavity of the latter fuse some of the double chloride of magnesium and potassium over a gas flame. When the salt is fused pass up the pipe stem a fine iron wire, and allow it to project into the bowl, so as to have its point well below the surface of the fused salt. This wire should be connected with the negative pole of a battery of about six elements, the positive wire of which is terminated by a piece of gas coke which is made to just touch the surface of the fused mass. Decomposition at once commences, the result of which is the deposition of minute globules of metallic magnesium. This is a most interesting experiment, and one very easily performed without the least danger.

It must be recollected that the chloride of potassium present in the double salt plays but a mechanical part, and has not anything directly to do in the reduction of the metal.

III.—*Purification of the Metal by Distillation.*

The purification of the metal by distillation is the most certain and effectual method which can be adopted, and the invention of the apparatus by means of which this object can be accomplished on the large scale in an atmosphere of hydrogen is due to the ingenuity of Mr. Sonstadt. We may mention that the manufacture of magnesium on the large scale, according to Mr. Sonstadt's patents, is now being extensively carried on by Messrs. Mellor and Co., of Manchester. The last operation which magnesium has to undergo before it reaches the hands of the photographer consists in being formed into wire. Owing to the low degree of ductility possessed by magnesium this is a matter of considerable practical difficulty, as it cannot be easily drawn in the ordinary way into wire, but requires to be forced through small apertures in a steel block, the metal being kept at a heat below redness, at which point it is much more malleable than at ordinary temperatures. On this point, however, we can offer but little precise information, as the best mode of magnesium wire making is kept secret. Magnesium, when pure, is a silver-white metal, of specific gravity 1·75. It presents a crystalline structure, and is rather brittle. Its equivalent is 12. It exhibits much chemical analogy to zinc, but for certain reasons it is generally classed with the metals of the alkaline earths. It melts and volatilizes at nearly the same temperature as zinc. It does not easily oxidize in dry air, but if moisture be present it is rapidly covered with a film of hydrated oxide. It is quickly dissolved by diluted sulphuric acid with formation of Epsom salt. When thrown on a little very concentrated hydrochloric acid, it bursts into flame for an instant. It is not acted on by a mixture of concentrated nitric and sulphuric acids. It burns with great brilliancy when heated in the vapour of iodine and sulphur, but less brightly in that of bromine. It also burns in chlorine.

Professor Roscoe has estimated the expenditure of magnesium at ten grains for each portrait taken with the camera; but, even with the chemicals in good working order, this may be considered the minimum weight of metal required to be burnt. In conclusion, we may observe that the steady combustion of thick wires of magnesium may be materially facilitated by having the wire flattened out by passing between heavy rollers. This "ribbon" can be now purchased, and it burns more steadily and can be ignited more easily than the round wires at present in use.—*British Journal of Photography* and *Medical Press.*

BISMUTHI ET AMMONIÆ CITRAS.

BY N. GRAY BARTLETT.

A preparation, under the somewhat empirical name of "Liquor Bismuthi (Schacht)," was introduced to the profession some years since in England, and more recently it has been the subject of several notices in foreign medical publications.

This liquid contains a bismuthic salt in permanent solution, and is miscible with water without precipitation; its reaction is alkaline, and it possesses but little taste. These desirable properties, in a remedy usually administered in a comparatively insoluble condition, would seem to indicate that this solution had not received undue attention.

It is asserted by the originator, Mr. Schacht, apparently after abundant observation, that a fluid drachm of his preparation, containing one grain of teroxide of bismuth, is equivalent, in medicinal value, to a full dose of the subnitrate of bismuth.

The Liquor Bismuthi was subjected to analysis by Mr. Tichbourne, who found its constituents to be bismuth, citric acid, and ammonia. (Lond. Pharm. Journ. Jan. 1, 1864.)

Following the directions of that gentleman for its preparation, recently-precipitated teroxide of bismuth was boiled in a solution of citrate of ammonia; repeated trials proved the oxide to be but sparingly dissolved by this treatment, and demonstrated the impracticability of this process. The alternative method suggested, that of substituting citrate of bismuth for the oxide, yielded a more satisfactory product.

The writer, having observed the solution of citrate of bismuth, obtained by the addition of ammonia, to have an acid reaction, and also that an excess of that alkali occasioned a precipitate of oxide of bismuth, inferred the existence of a compound salt of bismuth and ammonia; this was subsequently confirmed.

The following formulas, suggested by theory and numerous experiments, were finally adopted:—

Bismuthi Citras.

Take of
Subcarbonate of Bismuth, a troy ounce;
Citrate of Potassa, a troy ounce and 120 grains;
Nitric Acid, a troy ounce and a half;
Distilled Water, a sufficient quantity.

Dissolve the subcarbonate of bismuth in the nitric acid, and, when effervescence has ceased, dilute the solution with a fluid ounce and a half of distilled water, gradually added. Dissolve the citrate of potassa in two pints of distilled water, and *to this* liquid add slowly, with constant stirring, the acid solution of bismuth.

Permit the mixture to stand for several hours; then pour it on a moistened paper filter, and when the liquid has nearly ceased to pass, cover the surface of the precipitate with distilled water.

Repeat this operation until the washings no longer contain nitric acid. Allow the magma to drain, and dry it on bibulous paper, with a gentle heat.

Bismuthi et Ammoniæ Citras.

Take of
Citrate of Bismuth, in powder, a convenient quantity;
Stronger Water of Ammonia,
Distilled Water, each, a sufficient quantity.

Rub the citrate of bismuth with sufficient distilled water to reduce it to a uniform pasty consistence, and add, cautiously, with constant trituration, stronger water of ammonia, until a solution is obtained, observing to avoid an excess of ammonia.

Filter the liquid through paper, returning the first portions that pass, should they be turbid.

Spread the clear solution on glass, that the salt may dry in scales.

Liquor Bismuthi et Ammoniæ Citratis.

Take of
Citrate of Bismuth and Ammonia, 260 grains;
Alcohol, 2 fluid ounces;
Distilled Water, 14 fluid ounces;
Water of Ammonia, a sufficient quantity.

Dissolve the citrate of bismuth and ammonia in the distilled water; neutralize the liquid with water of ammonia, and mix it with the alcohol.

Or, take of
Citrate of Bismuth, recently precipitated and still moist, a convenient quantity;
Water of Ammonia,
Alcohol,
Distilled Water, each, a sufficient quantity.

Add gradually to the citrate of bismuth water of ammonia, until the precipitate is dissolved, and a neutral solution is obtained. Dilute this with its volume of distilled water, and filter through paper, returning the first portions of the filtrate, if necessary, until the liquid passes clear.

To half a fluid ounce of this solution add hydrosulphate of ammonia in slight excess. Pour the mixture on a tared paper-filter, wash the precipitate thoroughly with distilled water, and dry it at a temperature of 212°. Weigh the filter and its contents, deducting the weight of the former to obtain that of the tersulphide of bismuth, which, in grains, is to form the third term in a rule-of-three proportion, thus:—

$$\begin{array}{cc} (BiS_3) & (BiO_3) \\ 261 : & 237 :: \end{array}$$

the weight of tersulphide of bismuth to that of teroxide of bismuth in half a fluid ounce of the solution.

Apply the same ratio to the remainder of the liquid, and dilute it to such an extent that a grain of teroxide of bismuth will be contained in each fluid drachm of the finished solution; seven-eighths of which measure must be made up with distilled water, and the remainder with alcohol.

For preparing the citrate of bismuth, the subcarbonate is preferable to the subnitrate, because of its more uniform composition, as well as its greater purity, at least in commercial specimens of these salts. The metal itself is inferior to either, as it is almost invariably contaminated with arsenic.

The bismuth and potassa salts are employed in nearly atomic proportions for the production of a neutral citrate of bismuth; the potassa salt, however, is in slight excess on account of its deliquescent nature. By using solutions considerably diluted, the precipitate is rendered less dense, and the washing, by displacement is thereby facilitated. This is a tedious part of the process, but the best means of accomplishing the purpose. Washing by decantation is inapplicable, for, before it has been carried to a sufficient extent, a portion of the powder will remain suspended in the liquid, and can only be separated by boiling.

It also entails a greater loss of the citrate of bismuth, which is slightly soluble in water. The absence of nitric acid from the washings can be judged of approximately by the taste, but better by faintly tinging a portion of the liquid with sulphate of indigo, and boiling in a test-tube for a few minutes; if the colour be retained, no nitric acid is present.

In the preparation of citrate of bismuth and ammonia, the citrate of bismuth previously dried is employed, in order that a concentrated solution may be obtained without resort to evaporation, as the heat necessary in this operation occasions a precipitate, caused, apparently, by a loss of ammonia.

The solution should be spread with a brush on panes of glass to dry.

Citrate of bismuth and ammonia, as thus prepared, is in the form of brilliant white, semi-translucent scales, not at all deliquescent, but readily soluble in distilled water.

An aqueous solution of this salt, if long kept, like those of the citrates in general, is subject to spontaneous change. The additions of small portions of alcohol and ammonia, as indicated in the formulas for a solution of citrate of bismuth and ammonia, will, it is believed, preserve it indefinitely. The same result could probably be secured by means of sugar, with the additional advantage of a more agreeable taste.

The composition of the compound salt, determined by direct analysis, is as follows:—

BiO_3	=	237	=	50·11 per cent.
NH_4O	=	26	=	5·50 „
$C_{12}H_5O_{11}$	=	165	=	34·88 „
$5\,HO$	=	45	=	9·51 „
$BiO_3, NH_4O, Ci + 5\,HO$	=	473		100·

The bismuth contained in the washings can be recovered by neutralizing them with ammonia, and treating with sulphuretted hydrogen. The precipitated tersulphide of bismuth, after having been washed and dried, may be reduced to the metallic state, or converted into the subcarbonate by suitable means.

The writer is unable to state any facts in relation to the therapeutical properties of citrate of bismuth and ammonia. Owing to its solubility, it would undoubtedly be more perfectly diffused over the mucous surfaces, or more readily absorbed into the system, than the ordinary salts of bismuth.

Accepting the evidence of Mr. Schacht as conclusive, the dose of this salt would be two grains, or of the solution a fluid drachm.—*American Journal of Pharmacy.*

Chicago, Illinois, November, 1864.

NOTES ON THE CANTHARIDES OF THE ARGENTINE PROVINCES.*

BY DR. HERMANN BURMEISTER.

The remarks of Don Camilo Giovanelli on the cantharides of this country in the 'Revista Farmacéutica,' vol. iv. no. 3, p. 71, induce me to send you a more detailed notice of these insects, so useful in medicine, and so abundant on our soil, as also in all other warm countries.

Cantharides belong to a family of *Coleoptera Heteromera*, *i.e.* of that section of *Coleoptera* which have five joints in the four fore feet, and only four in the hind feet; and this family is easily distinguished from others of the same section by its soft body, less horny on the surface; as also by the form of the hind part of the head, and the cloven claws.

The celebrated Latreille, the first entomologist of his time, has called the family of cantharides "*Vesicifica*," alluding to the caustic property possessed by many (although not by all) of the species. This property seems to reside, not in the fluids, but in the solids of the body, and chiefly in the horny covering; and it is stronger in proportion as that covering is rougher and more metallic. On this account, the European cantharis is probably one of the most efficacious, for it is one of the most resplendent, in its golden-green metallic lustre.†

The family of the *Vesicifica* is divided into two principal sections, viz. *Meloides* and *Cantharides*. The former have no wings, and the elytra are usually short; but the latter have longer elytra, and are furnished with wings.

Amongst the *Meloides* there is one species, *Meloë Proscarabæus*, which was at one time considered an antidote to hydrophobia. We have in this country only a single species of this section, viz. *Meloë miniaceo-maculatus*, figured in D'Orbigny's 'Voyage to S. America' (*Insect.* tab. 15, fig. 6). I have found this insect (which is easily recognised by the red spots on its small elytra) a few times in the interior of the province of Buenos Ayres. Another species, the *Meloë Klugii*, described and figured by Brandt and Erichson, in the Transactions of the Acad. Cæsar. Leop. Car. vol. xvi. pl. i. p. 103, t. 8, is found in the Banda Oriental. I have myself collected, during my travels in the Argentine Provinces, two new species,—the one in Mendoza (*M. sanguinolentus*, nob.), the other in Catamarca (*M. ebeninus*, nob). These four species are hitherto only known to exist in this part of South America.

The *Cantharides* are far more numerous, not only in other countries, but also in the Argentine Republic. Entomologists divide them into various genera, of which I have met with the following in this country:—

1. *Horia maculata*, Fabr.—This lives with the great bees which make their nests in the trunks of vines, and are called *Mangangas* (*Xylocopa*). The beetle destroys the bee by eating up its food, and even the bee itself in the grub state. It is the largest of all our native cantharides, being above an inch long. It is of a yellow colour, with black spots on the elytra.

2. *Tetraonyx*, Latr.—This has the body more robust—shorter and proportionally broader—than the other genera of the same family; it has also the antennæ less elongated and rather thicker; and the tarsi short, with broad triangular articulations. I have collected three Argentine species of this genus, one in Tucuman, two in Mendoza.

3. *Cantharis*, Latr. (Lytta, *Fabr.*)—Body longer or shorter, narrow; antennæ long, slender; feet elongated, with narrow slender articulations: these characters distinguish the true cantharides from allied genera. It is the most numerous group of all, contain-

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* 'Revista Farmacéutica' of Buenos Ayres, January, 1865.

† [It may be observed, however, that *Mylabris Cichorii*, Fabr., which is devoid of metallic brilliancy, has vesicating powers quite equal to those of the common cantharis.—Ed. Ph. J.]

ing above 100 species. I have collected in the Argentine Provinces up to this date eight species, of which only three were previously known. I shall confine myself to naming these three, which are:—

Cantharis adspersa (Lytta adspersa, *Klug, Nova Acad. C. L. C. Ac.*, vol. xii. pl. 2, p. 434, t. 25).—It is this species which is known here as the *Bicho moro*, and is so abundant in our gardens, where it does great damage by eating seedling plants. I have found it also in the Banda Oriental and in the province of Mendoza.

Cantharis punctata (Lytta punctata, *Germar, Spec. Insect. Nov.* i. 175, 287).—Very like the *Bicho moro*; but the elytra are more strongly marked with black dots, and the feet are of the same brownish black as the rest of the body. I have found this in the Banda Oriental, and in Entre-Rios near the Paraná.

Cantharis vittigera (Pyrota vittigera, *Bl., D'Orbigny, Voy. Entom.* 200, t. 15, f. 7).—Collected on the Paraná.

The last of these three species is naked on the surface; the other two have a very fine brown pubescence, with naked points. The remaining species are clothed in the same way, except one very small one from the Banda Oriental, and another very large one from Catamarca and Mendoza, and probably along the whole western side of the Republic (La Rioja, San Juan) at the foot of the Cordillera. This species, which I call *Cantharis viridipennis*, is one of the largest of all, being nearly an inch long, of a black colour, with yellow feet, and metallic-green elytra. It is probably also the most efficacious of the Argentine species, being the only one that has a metallic lustre, like the European species. The apothecaries of Mendoza employ it with very good effect.

4. *Nemognatha*, Illig.—This genus is easily distinguished by the prolongation of the lower mandible into a longish thread. I have one species, hitherto unknown, of a yellow colour, with black antennæ and tibiæ, from the Paraná. I shall call it *N. nigricornis*.

ON THE PREPARATION OF LIQ. FERRI PERCHLOR., P.B.

BY WILLIAM JARDINE.

(*Read before the Glasgow Chemists and Druggists' Association, February 16th*, 1865.)

About a year ago, when the tide of critical opinion anent the new Pharmacopœia ran high, I was induced to turn my attention to the process which it gave for the preparation of the Tinct. Ferri Perchlor., from the very adverse criticism with which that particular process had been assailed. During the discussion after the reading of Dr. James Morton's paper in the Hall of the Association Athenæum, several gentlemen expressed themselves in very decided terms as to the merits or demerits of the process. They had almost all obtained a product as black as ink, with a suffocating odour of nitrous acid, and which, when mixed with spirit, produced a tincture having the appearance of ink and water, and which in a few days deposited a copious sediment of basic perchloride of iron. One gentleman said, that in conducting the evaporation by the naked flame, he had made a mess of it, but had succeeded very well by using the water-bath; another said he had obtained a very fair product, but that it and the spirit fell out before they were a week together, and the iron, with a modesty more becoming than convenient, retired to the bottom of the bottle; while a third extinguished the discussion by declaring that it was a "beastly preparation." These expressions of opinion, together with the circumstance that I never had been satisfied with the tincture of steel prepared in the old way, induced me to give the British Pharmacopœia process a fair trial, convinced beforehand that the product could not be much more unsatisfactory than the extremely acid and inconstant preparation obtained by dissolving sesquioxide of iron in hydrochloric acid. I will now give you the results of my experiments.

The process is as follows:—

Take of Iron Wire, two ounces.
Hydrochloric Acid, ten fluid ounces.
Nitric Acid, six fluid drachms.
Distilled Water, seven fluid ounces.

Dilute the hydrochloric acid with five ounces of the water, and pour the mixture on the iron wire in successive portions, applying a gentle heat when the action becomes feeble, so that the whole of the metal may be dissolved. To the nitric acid add the two remaining ounces of the water, and having poured the mixture into the solution of iron, evaporate the whole until the bulk is reduced to ten fluid ounces.

The product is described as an orange-brown solution, without smell, but possessing a strong styptic taste, miscible with water and alcohol in all proportions. Diluted with water, it is precipitated white by nitrate of silver, and blue by the ferro-cyanide of potassium, but not by the ferrid-cyanide.

"Tests, specific gravity 1·388. A fluid drachm, diluted with two fluid ounces of water, gives, upon the addition of an excess of solution of ammonia, a reddish-brown precipitate, which, when well washed and incinerated, weighs 15·62 grains."

The first and most important question which falls to be answered is, Is the process theoretically correct? In order to arrive at a just conclusion on this point, we must first ascertain the nature of the chemical changes which are effected during the operation. The decomposition is as follows:—

$$6\,Fe + 9\,H\,Cl + NO_5 = 3\,F_2\,Cl_3 + 3\,HO + NO_2$$

The quantities of the various ingredients actually required may be demonstrated as follows:—

6 Fe	+	9 H Cl	+	NO_5
168 grains of Iron.		328½ grains of Hyd. Acid Gas.		54 grains of Anhydrous Nitric Acid.

Deduced by proportion for the Pharmacopœia formula, the quantities are as follow:—

Iron, 875 grains; hydrochloric acid gas, 1,711 grains; and anhydrous nitric acid, 281 grains. In round numbers, the formula would be—iron, two ounces; hydrochloric acid, sp. gr. 1–17, nine fluid ounces and six fluid drachms. Nitric acid, sp. gr. 1–5, four fluid drachms and eighteen minims; so that the formula given in the British Pharmacopœia is theoretically correct, and a little more.*

The next consideration, and the one which is perhaps of the most importance to us is, Is the process practically an efficient one? It is on this point that the opinions of practical men differ. The widely different results obtained by different operators is not at all surprising when we consider that many of them, though expert enough pharmaceutists, are not by any means expert chemical manipulators. The process is a chemical one, and while the compilers of the Pharmacopœia have been minute almost to a fault in the description of many of the chemical operations contained in that work, they have erred the other way in the one under consideration.

Before going further, I may as well describe what takes place during the progress of the operation. The solution of iron having been filtered, is of a very fine grass-green colour. They have omitted to direct filtration; but filtered it must be, in order to procure a really elegant product. Even the finest specimens of iron contain carbon, which shows itself as a black flocculent sedi-

* My calculations were made before the appearance of the February number of the 'Pharmaceutical Journal,' but my figures differed slightly from those given by Dr. Attfield, having calculated from different data. I have adopted his, as being the most likely to be correct.

ment when the iron is dissolved. When the nitric acid is added to this solution, the compound immediately assumes an intense inky-black appearance. Heat being now applied, brisk effervescence takes place, and continues till the liquid suddenly, and without any previous warning, boils up with great violence, throwing up a dense cloud of nitrous fumes. This violent action lasts only for a few seconds, and the moment it has subsided the liquid is seen to have assume the beautiful orange-brown colour, characteristic of solutions of perchloride of iron. The evaporation now proceeds quietly on to the close. Now, this sudden boiling up is the stone over which most of those in whose hands the process has failed have probably stumbled. Those, of course, who are chemical experts, or who have been in the habit of preparing persulphate of iron, expect it, and wait for it, and know that the process will not be complete until it takes place. But it may not be so with the pharmaceutist who has not been accustomed to chemical operations, and he would probably remove the heat before the action was terminated, and thus produce a mixture of proto- and perchloride of iron, with nitrous and nitric acids. This I believe to be the story of most of the failures which have been recorded. Why they have omitted in the Pharmacopœia to mention this sudden evolution of binoxide of nitrogen in describing the process under consideration, when they have not failed to do so in that for preparing persulphate of iron, is more than can be accounted for, but it is one of the much-to-be-regretted omissions in that otherwise admirable book.

In answer to the question, is the process of which the formula given in the British Pharmacopœia is an adaptation, an efficient one? I would most decidedly say that it is. I do not wish it to be understood that I consider it perfect, but I do think that the nitro-hydrochloric process (as it has been styled) is the most efficient that has yet been devised. In this month's number of the 'Pharmaceutical Journal,' Dr. Attfield says no; but his reasons for saying so appear to me to be very weak. We do not want a product absolutely pure; what we want is one that will keep, of constant strength, an elegant appearance. Such a product can be obtained with careful manipulation by following the direction of the Pharmacopœia, and it could perhaps be so modified that less careful manipulation would suffice to produce a like result. I have now a specimen that was made more than twelve months ago, and it is still good, so that there can be no doubt as to its stability. It contains no protochloride, not even a trace of it. It is deficient in chlorine, however, being very slightly basic; so that, though it keeps well enough for a few weeks when mixed with spirit, it ultimately deposits a very small quantity of basic perchloride.

For the purposes of this paper I have prepared ten ounces of solution of perchloride of iron, strictly following the directions of the Pharmacopœia. In order that every condition should be exactly as it is ordered in that work, I prepared my own hydrochloric acid, distilling the water required in its preparation myself. I also prepared my own nitric acid, and accurately ascertained the densities of both acids before using them. I have here a sample of the liquor so produced, and of the tincture prepared with it. The tincture has been made for fully a month, and is still perfectly bright and free from decomposition. I have very carefully examined this product. It has a specific gravity of 1·433. The Pharmacopœia directs it to have a density of 1·388, but there must be some mistake here. Dr. Attfield says that a solution of the officinal strength, prepared by dissolving anhydrous perchloride of iron in water, has a sp. gr. of 1·432, and this is about the density of all the specimens I have made. Two drachms of this liquor yielded thirty grains of peroxide of iron by precipitation with excess of ammonia: it should have yielded thirty-one; but the inevitable loss by contact fully accounts for this deficiency. Having ascertained that it contained no protochloride, I was wishful to know whether all the iron it contained was in the condition of Fe_2Cl_3. To find this out, I precipitated two drachms of the liquor with solution of nitrate of silver. Having ascertained that the quantity of chlorine required to form Fe_2Cl_3 with the iron present in the two drachms was 403 grains, I found that I should obtain $120\frac{1}{2}$ grains of chloride of silver. I obtained exactly 121 grains. This proves, not that there was no basic perchloride present in the liquor, but that the condition under which it is formed, namely, deficiency of hydrochloric acid, did not exist.

I have been led to adopt the following formula as the result of numerous experiments and observations on this subject:—

Take of Iron, two ounces.
Hydrochloric Acid, eleven fluid ounces.
Nitric Acid, sp. gr. 1·5, five fluid ounces.
Water, seven fluid ounces.

Dilute seven ounces of the hydrochloric acid with five ounces of the water; add the iron to the mixture, and place it aside in a warm place for twenty-four hours, or until the iron is dissolved; filter, then add first the remaining three ounces of hydrochloric acid, and then the nitric acid diluted with the remaining two ounces of the water; heat briskly until, on the sudden evolution of red fumes, the liquid assumes a dark orange-brown colour; then, with a gentler heat, evaporate until the liquid is reduced to ten fluid ounces. The above formula contains more hydrochloric acid and less nitric acid than are ordered in the Pharmacopœia. Mr. Squire recommends twelve ounces of hydrochloric acid, but I think eleven ounces sufficient, especially if the iron be added to the quantity of acid merely requisite for its solution. The five drachms of nitric acid I consider sufficient to convert all the proto- into perchloride, and there is less likely to be free nitric acid in the solution.

COCHINEAL COLOURING.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Seeing in your February number a new form for cochineal colouring, I tried it, with the following results:—After adding the Liq. Ammon. Fort. to the infusion, I put a few drops of the colouring in ʒiv of water, and let it stand for three hours exposed to the action of the atmosphere, when I found that the ammonia had quite evaporated, leaving the liquid of a dirty brown colour. Now I conclude from this fact that if this colouring were used in a jelly, the ammonia would be evaporated with equal facility, and thus render it of such a nasty colour as to be unfit to place on the table. I also found that when used as red ink it turned to brown in a few minutes. Again, I put ʒj of the colouring in ℥ij of water, and then added gr. v. of citric acid, when the solution turned to an orange colour. Now I believe that lemon juice is sometimes taken with jellies. If any were taken with a jelly coloured by this colouring, the effect would be that the jelly would be turned from a bright red (if it had not already turned brown by evaporation) to a pale yellow, to the great astonishment of the person about to swallow it. Again, I found that this colouring became in a few days a ropy and jelly-like mass, and with some difficulty miscible with water.

Your article entirely, but unjustly, condemned the old form of making the colouring with potash, alum, and cream of tartar, but I have proved that this form is the best, with a very slight modification. I always found that the old colouring became decomposed in about a week in warm weather, and smelt very offensive. I tried a small quantity of nitrate of potash to see if that would keep it, but found it as bad as ever. I then tried chloride of sodium (common salt) with perfect success, and since then I have kept some for two or three months, and it is now as sweet as when first made. I use ʒiv of salt to ℥viij of the colouring, and I find this an ample quantity. This colouring is, of course, much cheaper than the one made with spirit, and it also is not affected by citric acid. I make it in large quantities for Huntley and Palmer's biscuit manufactory, and so have ample opportunity for *testing its value.*

I remain, Sir, your obedient servant,

W. R. CHURCH.

Reading, March 11th, 1865.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—There can be no doubt that the "Cochineal Colouring," made according to the formula of Dr. George Dickson, of Edinburgh, published in the 'Pharmaceutical Journal' for February, is a very elegant preparation of its kind; but we must guard against the risk of sacrificing usefulness to elegance, or rather aim at combining both. Now, it appears to me that the formula in question has two objectionable characteristics, viz. the large quantity of spirit and the delicacy of the ammonia tint. The first would have a tendency to cause a cloudy appearance in bright jellies and other preparations containing gelatine, and the ammonia colour would be liable to be completely changed when brought in contact with lemon juice, baked pears, and other acids met with in the many culinary purposes for which the article is largely used.

If you think proper to publish the following formula, which I have used for many years with perfect success, those who try it will find that it remains bright for any length of time, does not throw down any precipitate, and is almost unalterable by contact with either acids or alkalis, which is no small advantage.

Take of Cochineal in Powder,
Carbonate of Potash,
Bitartrate of Potash,
Alum,—of each one ounce.
Water, seven ounces.
Spirit of Wine, one ounce.

Boil together in glazed vessel until the effervescence ceases (about ten minutes); when cold, pour on a filter and wash with water to make up eight ounces fluid. In this liquid dissolve an equal weight of refined sugar by means of sufficient heat, and set aside for use.

I do not know how much this differs from the formulas in general use, but it is perfectly successful.

I am, Sir, yours obediently,

WALTER BIGGS.

Hampstead, March 20, 1865.

PHARMACOPŒIA OF INDIA.

For some months past, a proposition relative to a pharmacopœia for India has been under the consideration of the Secretary of State for India. The *Bengal Dispensatory* of 1842 and *Bengal Pharmacopœia* of 1844, both published at Calcutta under order of the Government, by Dr. W. B. O'Shaughnessy, have long been out of print, and copies of either work can only be obtained with difficulty. Meanwhile the study of medicine has made great progress among the natives of India, and graduates in medicine and surgery are constantly quitting the Presidency colleges of Calcutta, Madras, and Bombay, and establishing themselves in various towns of the empire. The European population is also upon the increase, and the attention of the intelligent classes is being directed more than ever to the development of the resources of that rich country.

Under these circumstances, the Indian Government has thought it advisable to authorize the publication of a work which shall afford to the medical men and pharmaceutists of India information of the same character as that supplied by the pharmacopœias of Europe, but with particular regard to indigenous medicinal products.

The labour of preparing this work has been entrusted to Mr. Edward John Waring, F.R.C.S., Surgeon in Her Majesty's Indian Army, author of a *Manual of Practical Therapeutics* and of numerous papers on Indian pharmacology, assisted by a committee consisting of the following gentlemen, viz. Sir J. Ranald Martin, Sir William Brooke, Drs. Thomas Thomson, Robert Wight, J. Forbes Watson, Alexander Gibson, and Mr. Daniel Hanbury. The first meeting of the committee was held at Cannon Row, Westminster, on the 15th March, after an interview with Lord Dufferin, the Under Secretary of State, at the India Office.

REVIEW.

A Manual of Practical Therapeutics, considered chiefly with reference to Articles of the Materia Medica. By Edward John Waring, F.R.C.S., F.L.S., Surgeon in Her Majesty's Indian Army. Second Edition. London: John Churchill and Sons. 1865.

This second edition of Mr. Waring's manual, as may be seen by the above title, embraces a wide field of inquiry, comprising, in fact, all articles of the Materia Medica which have obtained any repute, not only in this country, but also in other parts of the civilised globe. Mr. Waring says: "This Edition contains all the preparations of the new British Pharmacopœia, together with notices of the principal new remedies which have been introduced into practice since the publication of the First Edition in 1854. It may, perhaps, be objected that some of these have been too slightly touched upon, whilst undue prominence has been given to others. On this point I would observe, that in a work of limited size such as the present, it was impossible to treat all articles to the extent which they perhaps deserve; and that, in selecting articles for particular or extended notice, I have exercised my discretion to the best of my ability. It is believed that nothing of vital importance in therapeutic discovery has been omitted."

We think that generally the author has made a judicious selection of articles of the Materia Medica for extended description, but we should have been inclined to have employed the pruning-knife with a far more vigorous hand in the less-important articles. Thus, such substances as *Arctium Lappa, Chenopodium olidum, Cicuta, Cuckoo Flower, Elder Bark, Fraxinus excelsior, Indigo, Marrubium vulgare, Lythrum Salicaria, Oleander, Ononis spinosa, Oryza sativa, Plumbago europæa*, etc., *Scrophularia nodosa, Scutellaria galericulata*, and numerous others, can have very little, if any, claims for notice in a scientific treatise on Therapeutics. Why *Prunus* or *Cerasus virginiana*, a well-known American remedy, and one frequently prescribed in this country, should be omitted altogether when such articles are retained, we are unable to explain. Many other articles, although scarcely employed in this country, are very properly retained from the reputation they have acquired in the East Indies, as Mr. Waring, from his long residence in India, and extensive acquaintance with Indian remedies, is especially well qualified for this portion of his task.

The various substances treated of are arranged alphabetically; hence the work is better adapted for reference by the medical practitioner than for systematic study by the student. The alphabetical arrangement is preceded by an introductory chapter on Therapeutics generally, where the reader will find some useful remarks upon the "Arrangement of the Articles of the Materia Medica," "On the Art of Prescribing Medicines," "The Circumstances which Modify the Action of Medicines," etc. Our readers will like to be informed that "the taste of senna may be concealed by sweetening the infusion, adding milk, and drinking as ordinary tea, which, when thus prepared, it much resembles."

The alphabetical arrangement, which extends over 740 pages, is followed by a Second Part, comprising 120 pages, treating of medicinal agents and classes of medicines. This is succeeded by a most useful Index of Diseases, in which, under each disease, a list of the remedies treated of in the volume, and a reference thereto, is given. The whole is concluded by an Index of the Medicines, etc., which have been described.

Upon a general glance at the volume, we think that the information it contains may be generally relied upon, but we have detected some errors. Thus, amongst others, the "Guaco," described as being recommended by Dr. Pritchard in Gout, is said to be derived from *Mikania Guaco*, H. et B., Nat. Ord. Asteraceæ, instead of from a species of *Aristolochia;* Mezereon of the British Pharmacopœia is said to be obtained *solely* from *Daphne Mezereum*, which plant is also called Spurge Laurel; *Piper nigrum* is said to be chiefly imported from the West Indies; the root of *Inula Helenium* is stated to be officinal, and its therapeutic uses to be similar, but inferior, to Gentian; *Lavandula vera*, *Lavandula Spica*, and *Lavandula angustifolia*, are all grouped together, and receive the name of Common Lavender. After speaking of Sarsaparilla, it is stated that the above remarks apply not only to the ordinary Sarsaparilla (*Smilax Sarsaparilla*), but to the other species which are occasionally employed. Again, we ask upon what authority does Mr. Waring spell Artem*i*sia Artem*e*sia, and Cæsalpin*ia* Cæsalpin*a*? We notice these words, because it is evident, from their frequent occurrence, that such modes of spelling are regarded as correct.

Although in our position of reviewer we have noticed some inaccuracies, etc., in the volume, we regard the work generally as a very useful compilation, and one which reflects much credit upon the author. It is from its very nature and arrangement less adapted to the student than to the practitioner, but to the latter, especially if he be going abroad, it will be found a valuable volume, and to the Indian practitioner almost indispensable.

Accidental Poisoning by Arnica Liniment.—An inquest was held at the Swan Hotel, Alton, on Tuesday, March 14th, before Mr. J. R. Trodd, county coroner for Hants, on the body of Mr. William Madgwick, for many years the manager of the above-mentioned hotel, who met with his death under the following very distressing circumstances:—The deceased gentleman, who it appears was suffering from a slight attack of chronic rheumatism, retired to rest about ten o'clock on the evening of Saturday, the 11th inst., previous to which he procured an arnica liniment, which appears to have been composed of three drachms of tincture of arnica, two drachms of tincture of opium and seven drachms of compound camphor liniment, to apply externally to the parts affected by the rheumatism. This liniment he had been in the habit of using in a similar manner when suffering from rheumatism for the last six years. He also procured a pill and black draught, and on retiring he took the pill and intended to have taken the draught on the following morning. Both the draught and liniment were placed on a dressing-table in his bedroom in two small phials, which, although received from different chemists, were of the same size and shape, and the contents of both nearly of the same colour. About 6 o'clock on the following (Sunday) morning, an attendant who slept in the next room to the deceased had her attention called to him by his knocking, as if in need of assistance. She went to him, and on entering his room found him sitting, partly dressed, by the side of his bed, and he informed her that he had swallowed the liniment by mistake, instead of the black draught, and that on discovering what he had done he had afterwards taken the draught. She instantly informed the housekeeper what had happened, and Dr. Leslie was immediately sent for, who promptly attended and found the deceased suffering from constriction of the throat, and experiencing great difficulty in breathing. The most energetic measures were immediately taken by Dr. Leslie to allay the effects of the poison; strong emetics were administered, the stomach pump was applied, and the whole contents of the stomach removed, but the efforts were unsuccessful, the active principles of the arnica, according to the medical evidence, having been rapidly absorbed, causing spasm of the glottis, and death from asphyxia. The jury returned a verdict of "Accidental death," and recommended that, for the preservation of human life, there should be a special enactment or a general rule to provide that all chemists should on issuing any poisonous liquid use a bottle of a different shape to that containing harmless drugs.

BOOKS RECEIVED.

On the Inhalation of Gases and Medicated Vapours, in the Treatment of Consumption and other Pulmonary Diseases; with a paper on the Treatment of Whooping-cough. By W. Abbotts Smith, M.D. London: Robert Hardwicke, 192, Piccadilly.

A Suggestion as to the Feeding of Milch Cows, with a view to an Improvement in the Constitutents of the Milk. By "Humanitas." (Pamphlet.) London: Booth and Co., 307, Regent Street.

Stammering and Stuttering, their Nature and Treatment. By James Hunt, Ph.D., F.S.A., etc. etc. Sixth Edition. London: Longman, Green, Longman, and Roberts Paternoster Row. 8vo. p. 275. 1865.

TO CORRESPONDENTS.

Z. Y. X. (Sandown).—*Sale of Coffee and Cocoa.* See Vol. I. (2nd series) p. 396.

X. Y. Z. (Fleet Street).—*Solution of Pentasulphide of Calcium.* Sulphur, 1 ounce lime, 5 ounces; water, 20 ounces. Boil together for half an hour, and let the product measure 10 fluid ounces.

"*Delta*" (Cork).—(1) No. (2) The addition of camphor to the spirit would be an unworthy evasion of the law. (3) Chemists cannot take out a licence for the sale of Spirit of Wine, but are permitted to sell it in small quantities for medicinal use.

S. K. L.—We recommend our correspondent to apply to Bishop Colenso.

"*Delta*" (Spilsby).—(1) Fownes's 'Manual of Chemistry;' and Bentley's 'Manual of Botany.' (2) Apply by letter to the Secretary, 17, Bloomsbury Square, for a copy of the regulations.

"*Pharmakon.*"—Candidates for the Bell Scholarships must be Associates, Apprentices, or Students on the Register of the Pharmaceutical Society; but the length of time occupied in study at the Laboratory is optional with the Candidate.

"*Alpha.*"—*Tinctura Ferri Acetatis Etherea.* To 9 parts of solution of Acetate of Iron, add 1 part of Acetic Ether, and 2 parts of Rectified Spirit.

A. P. S. (Horncastle).—Not yet published, but will appear early in May, probably by the 1st. This will then be the Text-Book used at Bloomsbury Square.

H. and *H.*—Commercial sponge is described by Pereira as "the dry skeleton of the animal, from which the gelatinous flesh has been removed."

A Registered Apprentice. (London).—In the British Pharmacopœia.

A Young Student (Yarmouth).—Bentley's 'Manual of Botany.'

A. B. C.—We have seen the letter alluded to, and have no doubt that our Local Secretary is able to give a satisfactory answer to the charge of "misrepresentation."

C. A. R. (Maidstone).—The work referred to is not yet published.

Inquirer (Nottingham).—The new edition of Pereira's Materia Medica will, we understand, be ready by the first week in May.

Two or three communications are unavoidably postponed.

Erratum.—In number for March, page 453, line 12 from the bottom, *for* "Cadico," *read* "Cacheo."

Mr. Thonger is thanked for his communication.

Instructions from Members and Associates respecting the transmission of the Journal before the 25th of the month, to Elias Bremridge, Secretary, 17, Bloomsbury Square, W.C.

Advertisements (not later than the 23rd) to Messrs. Churchill, New Burlington Street. Other communications to the Editors, 17, Bloomsbury Square.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VI.—No. XI.—MAY 1st, 1865.

THE PROPOSED LEGISLATION AFFECTING PHARMACY.

Before our next issue it is probable that the subject which has been engrossing the attention of chemists and druggists for the last twelve months will be finally settled, or at least so far advanced that its settlement may be pretty well foreshadowed. In the meantime, it is interesting to watch the discussion which has arisen on the introduction of two Pharmacy Bills at the same moment to Parliament,—a discussion which clearly shows that the question is regarded as one of *public*, and not merely *class* interest.

There may be different opinions as to the method of carrying out the necessary arrangements, but there seems little variance as to the need for some legislative enactments to regulate the qualifications of chemists and druggists, and the universality of the demand for protection on the part of the public proves that we were not wrong in declaring last year that the time had arrived when the work which the Pharmaceutical Society commenced in 1841 might be consummated. In 1852 the promoters of the Pharmacy Bill asked too much; in 1865 they have erred, some say, in proposing too little. The love of "free-trade" is no way diminished, indeed it has become more general, but perhaps, as a necessary consequence, is held more temperately; so that men who stand up for the greatest liberty of the subject in buying and selling, as well as in higher matters, admit that when the public safety requires it the "skid" must be applied. Before a railway can be opened for general traffic, a Government inspector must pass over it and give his certificate of approval. If a ship sail from our docks, she must be commanded by an examined captain; if she be intended for the conveyance of passengers, her mate must also be duly qualified. By the arrangements of a free-trade Government every man who would serve the State, whether as a Foreign Office clerk or a tide-waiter, must prove his capability for the duty by submitting to an examination.

The debate on the second reading of Sir Fitzroy Kelly's Bill (a report of which appears in another part of this Journal) displays a wonderful unanimity of opinion on two most important points—the necessity of rendering examination compulsory, and the Board to which that examination should be entrusted. The honourable and learned member for Suffolk stated his case to the House with his usual perspicuity; it was evident that he had not consented to take on trust the merits of a Bill for which he was to stand godfather, but had, on the contrary, carefully considered and made himself master of the whole question—the public necessity, the point to which legislation might be carried, the danger or inconvenience of going beyond that point, the antecedents and present position of the Society which had prepared the Bill, the relation which that Society bears to the whole body of Chemists and Druggists, and the way in which it had performed its duty to the public in carrying out the Pharmacy Act of 1852. And of those who followed him in the discussion not one attempted to controvert his statements. Even Sir John Shelley himself, who was to move the second reading of the "Chemists and Druggists Bill No. 2," bore handsome testimony to the good which had been done by the Pharmaceutical Society, expressing an earnest hope that it would go on in its old course, and, although chemists and druggists might be more easily qualified under his Bill, that they, or at least very many of them, would not rest contented until they had achieved a higher position by registration as Pharmaceutical Chemists under the Act of 1852. And when Sir George Grey, in answer to the appeal of Mr. Roebuck, rose to state the views of Government on the question, he at once affirmed the great principle that *if there were to be examination, that examination might be safely entrusted to the Pharmaceutical Society.* He took no exception to any provisions of Bill No. 1, but was anxious to extend its operation to the sale of dangerous drugs as well as dispensing, and restrictions on selling being proposed in Bill No. 2 he thought it better that both Bills should be referred to a Select Committee, which would at the same time consider the respective claims of the two societies from whom they emanated. Although we believe that had Sir Fitzroy Kelly pressed his measure on the House without reference to such a committee the majority would have been with him, we do not for a moment regret that he assented to the Home Secretary's suggestion. The discussion of that day did infinite service to our Society, and the investigation "*upstairs*" will greatly extend that benefit.

Following on Parliament, the press has devoted space to the consideration of the two Bills, generally with the same tendency; and even 'Punch' seemed delighted at the chance of indulging his natural hilarity in describing the dialogue betwixt "Kelly" and "Shelley."

Our subject is a special one, and one on which the "Medical Press" may be supposed to speak with some authority and claim to attention. We have therefore read with much interest the articles which have appeared in the medical journals, particularly that in the 'Lancet' of the 1st ult., and commend it to all our members.

But doctors differ, sometimes it is to be feared from mere rivalry, and on this case we find the 'Medical Times' utterly at variance with its great contemporary, as to the desirability of educating chemists and druggists. We saw an advertisement, put forth the other day by a general practitioner, wishing to find a new place for his faithful "*Buttons*," who besides cleaning boots and shoes, and doing a little stable-work, *could be well recommended as a dispenser!* And when we remember that it was last year stated in the 'Medical Times' that a few weeks' practice would make any "neat-handed woman" or lad into a trustworthy compounder of physic, which should carry relief, but may carry death to suffering humanity, we are not quite at a loss to imagine the class in whose interest the editor writes; it is the class mentioned in the able article which appeared in the 'Saturday Review' of April 8th; a certain section of medical practitioners, who having marked the aid given by the Apothecaries' Act of 1815 to members of their own order, to elevate themselves by trenching on the ground formerly occupied by physicians, now tremble lest a similar uprising should occur among chemists and druggists if they be "*taught too much.*" The 'Saturday Review' traces the course of the apothecaries, and conclusively disposes of the objection in the following brief sentence:—

"*This, however, is a matter which concerns only a fraction of a class, while it concerns society that nobody should meddle with medicines who does not understand their properties.*"

Pages of argument could not more perfectly show the injustice and impolicy of protecting the interest of the apothecaries by maintaining the ignorance of chemists and druggists, than these three lines, and we advise our medical contemporary to cast about for some better means of effecting his object.

We would even venture to refer him to the debate in the Medical Council, which happens opportunely to have taken place during the past month. He will find that when Dr. Acland proposed the appointment of a Committee to watch the progress of the two Pharmacy Bills, and consider the general question of medical practice by Chemists and Druggists, no member of that enlightened assembly, which governs and protects the profession, ventured to suggest the "old-world" means of prevention which he recommends; on the contrary, the qualification of dispensers is as much insisted on by the Medical as by the Pharmaceutical Council.

An extract from the Minutes of the proceedings of the Council (which will be found elsewhere in this Journal) sets forth the general view taken of Sir Fitzroy Kelly's Bill, and more particularly enters on this question of counter practice, proposing an addition to the 17th Section (which now declares that no provisions of the Act are in anywise to interfere with the vested interests of medical practitioners) of these words:—"*or to entitle any person registered under this Act to practise Medicine or Surgery, or any branch of Medicine or Surgery.*"

We are bound to pay all respect to the complaint brought against us in this quarter, and, although we think the grievance somewhat overstated, we are compelled to confess that it is not entirely without foundation. In some districts, inhabited by the poorer classes, the druggist is too often appealed to for medical advice, and often compelled by circumstances to give it; but, as a practice, we are as anxious as our medical brethren to check this, and the gentlemen of the Medical Council bear testimony on our behalf in this matter. The 'Lancet' asks us to give some pledge of our willingness to restrict our trade to its proper limits, and we presume the clause proposed by the Medical Council for insertion would be regarded in that light. Agreeing with it in principle, we could not object to its introduction, if Parliament offered no objection; but on this point we feel somewhat doubtful, because it is the *Law* which speaks in an Act of Parliament, not the *subject*, and *pledges* are not usually given therein. Each branch of the profession must set up its own landmarks, and seek power from the Legislature to protect them. We at once acknowledge the justice of this, and feel the duty that devolves on us to prevent by the moral influence of our Society an interference with matters for which we are not qualified, either educationally or legally. As proof of this we may refer to the 8th section of the Pharmacy Act of 1852, in which the nature of our examinations is set forth, and in which will be found these words:—

"*Provided always, that such examinations shall not include the theory and practice of Medicine, Surgery, or Midwifery.*" But we cannot be made the inhibitive power on both sides; that would be contrary to the custom of legislation, and about as reasonable as to ask that the College of Surgeons should prosecute one of its Fellows for prescribing in a purely medical case. We ask for power to protect our own boundary from encroachment by unqualified persons, and we should be equally glad to see a like power given to the higher Medical Boards for their special defence.

This, indeed, is a matter on which there should be no misunderstanding; it has been too much the fashion to regard doctors and druggists as natural enemies, but that fashion has been much changed during the last twenty years, and chiefly, we believe, by the influence of the Pharmaceutical Society, which, by bringing these "natural enemies" together, has shown both how necessary they are to each other.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *April 5th*, 1865,

Present—Messrs. Bird, Bottle, Davenport, Deane, George Edwards, J. B. Edwards, Hanbury, Haselden, Hills, Morson, Orridge, Savage, Squire, and Waugh,—

The following Pharmaceutical Chemist was elected a

MEMBER.

Henry Anthony Peele ....Durham.

EXAMINATION, *April 12th*, 1865.

Registered as Pharmaceutical Chemists.

Berridge, Alfred ....Leicester.
Bing, Edwin ....Cambridge.
Farnsworth, Thomas ....Codnor.
Jarvis, William ....New Brighton.
Morgan, Richard ....Newtown, Glamorganshire.
Yeoman, John.......................................Stockport.
Hogarth, William ....Preston.

EXAMINATION, *April 19th*, 1865.

MAJOR (Registered as Pharmaceutical Chemists).

Bennett, George ....Chesterfield.
Shephard, Thomas F..............................Brighton.

MINOR (Registered as Assistants).

Amoore, Charles Robert ....Hastings.
Harper, George ....Cambridge.
Hitchcock, Arthur William ....Oxford.
Thorn, John Thomas...............................Crediton.
Wilkinson, Joshua H...............................Blackheath.
Smith, Alfred ....London.
Thurston, Frederick ....Ipswich.

CLASSICAL.

Name.	Residing with	Address.
Brown, Samuel	Mr. Pipes	Beverley.
Butcher, Henry	Mr. Botham	Sheffield.
Cleaver, Edward Orlando	Mr. Geldard	Plymouth.
Cooper, Herbert Hudson	Messrs. Banks and Richards	Birmingham.
Joseph, Arthur	Mr. Joseph	St. Leonards.
Moore, John Shipp	Mr. Kendall	Stratford-on-Avon.
Mountain, Mr. Robert	Mr. Pullan	Hartlepool.
Raworth, Harrison Walker	Mr. Shorland	Bristol.
Sadgrove, Arthur Augustus	Mr. Cooper	Faringdon.
Strickland, Henry	Mr. Abbott	Darlington.
Thomas, Adolphe H.	Mr. Walker	Bath.
Thompson, John Thomas	Mr. Thompson	Richmond, Yorkshire.

BENEVOLENT FUND.

The sum of £25 was granted to the widow and children of a late Member in the North of England.

The sum of £10 was also granted to the orphan daughter of a late Member in the South of England.

SUBSCRIPTIONS AND DONATIONS RECEIVED DURING MARCH AND APRIL:—

LONDON.

	£	s.	d.
Allchin, Alfred, Barnsbury	0	10	6
Applegate, Edwin, Upper Holloway	0	10	6
Attwood and Hugill, 61, Cannon Street	1	1	0
Baker, Alfred P., Old Kent Road	0	10	6
Barron, F., 2, Bush Lane	2	2	0
Bird, Augustus, Kensington	1	1	0
Bishop, Alfred, Mile End New Town	2	2	0
Bradley, John, St. John's Wood	0	10	6
Burgoyne and Burbidge, Messrs., Coleman St.	2	2	0
Chubb, James C., 59, St. John Street	1	1	0
Cocksedge, Henry B., 20, Bucklersbury	0	5	0
Coles, John, Camberwell New Road	0	10	6
Cooke, John, 171, Hoxton Old Town	0	5	0
Darby and Gosden, 140, Leadenhall Street	2	2	0
Deane, Henry, Clapham	1	1	0
Dyson, William B., South Kensington	0	10	6
Faulconer, Robt. S., Walworth	1	1	0
Fincham, Robert, 57, Baker St.	2	2	0
Forest, Richard, 9, Celbridge Place	0	10	6
Fox, W., Church St., Bethnal Green	1	1	0
Gadd, Chas., Vauxhall	0	5	0
Garden and Robbins, 327, Oxford Street	1	1	0
Gedge, William S., St. John St.	0	10	6
Griffiths, John, Clerkenwell Green	0	10	6
Hickley, Thomas P., Edgware Rd.	0	10	6
Hills, Thomas Hyde, 338, Oxford Street	1	1	0
Barnard, J. do.	0	10	6
Gale, Samuel "	0	10	6
Middleton, F. "	0	10	6
Fletcher, John "	0	5	0
Haddock, George J. "	0	5	0
Hardy, Samuel C. "	0	5	0
Heale, William "	0	5	0
Hickman, William "	0	5	0
Machray, William "	0	5	0
Millar, Fredk. C. M. "	0	5	0
Sanders, Albert J. "	0	5	0
Spearing, James "	0	5	0
Swenden, James "	0	5	0
Tanner, Benjamin "	0	5	0
Wearing, Richard H. "	0	5	0
Wigg, Henry John "	0	5	0
Hooper, Bartlett, 43, King William St.	0	10	6
Horncastle, John, 12, Stanhope Terrace	0	10	6
Howell, Thomas, High St., Camden Town	0	10	6
Howell, Maurice, Peckham	0	10	6
Huxtable, John, St. John Street Road	1	1	0
Johnson, Benj. M., 70, Tottenham Court Road	0	5	0
Kendall, Chas. F., Clapham	0	10	6
Kent, Thomas, 226, Blackfriars Road	0	10	6
Large, J.H., 65, New North Road	0	10	6
May, John, Battersea	0	10	6
Merrell, James, Camden Town	0	10	6
Mitchell, John, Upper St., Islington	0	10	6
Moore, Jas. L., 1, Craven Place	0	10	6
Mould, Samuel, 21, Moorgate St.	0	10	6
Orridge, Benj. B., 30, Bucklersbury	1	1	0
Penrose, Arthur W., 7, Amwell Street	0	10	6
Peppin, Sydenham H., 25, Princes St.	0	10	6
Pollock, Thos., 129, Fenchurch Street	1	1	0
Shirley, John G., 1, Westbourne Grove	1	1	0
Sims, John F., Hemingford Place	0	5	0
Smith, William F., Walworth	0	10	6
Stocken, James, 13, Euston Sq.	5	0	0
Tilburn, Robt. J., 223, Gray's Inn Road	0	5	0
Walker, Henry, 44, Bernard St.	1	1	0
White, Daniel, 19, Park Terrace	1	1	0
Windle, William, 48, Portman Place	0	10	6
Wood, Edward, Westminster Hospital	0	10	6
Wyman, John, 122, Fore Street	1	1	0
Young, George, Millwall	0	5	0

COUNTRY.

	£	s.	d.
Abergavenny, Ackrill, George ...	0	5	0
Blandford, Groves, Wellington E.	0	10	6
Bradford, Rogerson, Michael ...	1	1	0
Bridge, Thomas, James............	0	5	0
Bridgnorth, Deighton, Thos. M.	2	2	0
Brighton, Breton, Walter.........	0	10	6
" Cornish, Wm.	0	5	0
" Gwatkin, Jas. Thos....	0	10	6
Bristol, Butler, Samuel............	0	10	0
Carlisle, Sawyer, James	0	5	0
" Sowerby, John............	0	10	6
Croydon, Long, Henry	0	5	0
Deptford, Lockyer, Geo.	0	10	6
Devizes, Madge, Jas. C.	0	5	0
Diss, Cupiss, Francis...............	0	10	6
Dover, Bottle, Alex.	1	1	0
Dudley, Hollier, Eliott............	0	10	6
Dunfermline, Seath, Alexander...	0	5	0
Edinburgh, Allan, Bruce	0	5	0
" Brown, David R......	0	5	0
" Gardner and Ainslie	0	10	0
" Mackay, John	1	1	0
" Raimes and Co.	1	1	0
Fareham, Peat, Walter............	0	5	0
Gloucester, Hurst, Wm. F. H....	0	5	0
Harwich, Bevan, Chas. F..........	0	5	0
Hay, Davies, John L..	0	5	0
Horsham, Williams, Philip	0	10	0
Hull, Baines, James	0	5	0
Ironville, Greaves, Abraham ...	0	10	6
" Greaves, Wm. Saml....	0	5	0
Kaffraria, Daines, Thomas	0	10	6
Kilmarnock, Rankin, Wm.	1	1	0
" Borland, John	0	10	6
Leeds, Brown, Edward............	0	10	6
Lincoln, Tomlinson, Chas. K. ...	0	5	0
Llangollen, Jones, Humphrey ...	0	5	0
Ludlow, Cocking, George.........	0	5	0
Maidstone, Kirk, John	0	5	0
Manchester, Carter, Wm..........	0	10	6
" Walsh, Edward ...	0	10	6
" Wright, Charles ...	1	1	0
" Wilkinson, Wm. ...	1	10	6
" Jackson, Thomas ...	0	10	6
Monmouth, Dawe, Sampson ...	0	10	0
Newcastle, Procter, Wm..........	1	1	0
Newcastle-u.-Lyne, Cartwright, William	0	10	6
Oxford, Prior, George T.	0	10	6
Portobello, Kemp, David	0	10	0
Putney, Farmer, John	0	5	0
Rhyl, Jones, Ellis P.................	0	10	6
Ryde, I. W., Gibbs, William......	0	10	6
Salford, Manfield, Jas. W.	0	5	0
St. Alban's, Roberts, Albinus ...	1	0	0
Shaftesbury, Powell, John	0	10	6
Slough, Griffiths, Richard.........	2	2	0
Sowerby Bridge, Stott, Wm. ...	0	5	0
Stourbridge, Bland, John H......	0	10	6
Sydenham, Pocklington, Jas. ...	0	10	6
Thornton-in-Craven, Wilson, Thomas	2	2	0
Tunbridge Wells, Sells, Robt. J.	0	5	0
Weaverham, Manifold, Jno. J. ..	0	10	6
Woolwich, Rastrick, Jno. A. ...	0	5	0
" Bishop, Thos..........	0	10	6
York, Linsley, Thos.	0	5	0

DONATIONS.

	£	s.	d.
Hearon, M'Culloch and Squire, 5, Coleman St.	10	10	0
Maidstone, Argles, Son, and Stonham	5	5	0

PHARMACEUTICAL MEETING,

Wednesday, April 5th, 1865.

MR. T. H. HILLS, VICE-PRESIDENT, IN THE CHAIR.

The minutes of the previous meeting having been read, the following

DONATIONS TO THE LIBRARY AND MUSEUM

were announced, and the thanks of the meeting given to the respective donors thereof:—

The Chemical News.
The Chemist and Druggist.
The Technologist.

The Photographic Journal.
The Medical Circular.
The Dental Review.
The British Journal of Dental Science.
The Journal of the Chemical Society.
The Educational Times.
The Veterinarian.
The Journal of the Society of Arts.
Hardwicke's Science Gossip. From the respective Publishers.
Rust, Smut, Mildew, and Mould. An Introduction to the Study of Microscopic Fungi. By M. C. Cooke. From the Author.
Sample of Indian Hemp. From Dr. Leared.

Mr. D. Hanbury exhibited specimens of *Moringa aptera* from Engedi, Palestine, and of *Moringa pterygosperma* from Panama, and remarked that *Oil of Ben* might be obtained by expression from the seeds of either plant.

The following papers were read:—

RESINA JALAPÆ, P.B.

BY MR. A. F. HASELDEN.

Whilst preparing some resin of jalap according to the process set down in the British Pharmacopœia, several points occurred to me as seemingly worthy of consideration and inquiry. The mode of operating in the P. B. is exhaustion of the root by rectified spirit, the addition of a small quantity of water, the recovery of nearly all the spirit by distillation, the separation of the resin from the residual liquor, subsequent washing with hot water, and drying the resin with a gentle heat until it becomes brittle, breaking with a resinous fracture; and so far the process is all that is necessary in order to obtain the resin as described in the Pharmacopœia. The process might, however, have been carried further, and the brown resin thus obtained rendered colourless by digestion with animal charcoal, and thus have represented pure resin, or the jalapine of commerce. But I am far from certain that, therapeutically, the resin would have been improved. I think it quite possible that the animal charcoal does remove some of the acrid principle upon which the activity of jalap, as a cathartic, depends; and I am led to entertain this opinion from the fact that I have heard that jalapine does not act proportionately as well as good powdered jalap-root.

Now, amongst other things concerning jalap, Dr. Christison has stated that worm-eaten jalap is the best for the preparation of the resin. The late Dr. Pereira apparently entertained the same opinion, for, in his writings, he says jalap-root is apt to become worm-eaten, the insects attacking the amylaceous portion, leaving the resin; hence worm-eaten jalap is to be preferred for the preparation of the resin. On the other hand, Duncan, Thornton, and Brande say that worm-eaten jalap should be rejected. I may probably be thought presuming when I state that I cannot entirely coincide with either side. Looking at the manner in which the resin is deposited in the roots, in irregular concentric rings, and sometimes seemingly pervading the whole mass, I could not conceive that these worms or insects could remove the amylaceous or extractive portion, and leave the resinous part untouched. I, therefore, proceeded to extract the resins from two portions of jalap-root, the one worm-eaten, the other sound, as far as I could judge of the same quality in other respects—samples of them being upon the table—the worm-eaten gave me one ounce of resin from eight ounces or 12·5 per cent., and afterwards, by boiling with water, one ounce of soft aqueous extract; the sound jalap yielded from the same quantity one ounce and a half of resin, nearly 19 per cent., and two ounces or 25 per cent. of the aqueous product. Thus, though a wholesale manufacturer might use the worm-eaten for the preparation of resin, seeing that it would not command a ready sale as jalap-root for tincture, I should myself prefer the sound root. The next point of inquiry which suggested itself to me was one arising from the fact that the good Vera Cruz jalap being very dear, and another kind, described as Tampico jalap, being offered at a less price, the difference being one shilling and sixpence per pound, whether it would yield as good a product as the kind known as Vera Cruz jalap. It may be perhaps worth while to mention that Tampico is a port on the Gulf of Mexico, north of Vera Cruz, whence the jalap is exported, and from which circumstance it probably takes its name.

Operating upon the same quantity of this Tampico jalap, some of which is upon the table, I obtained exactly the same quantity of resin as I had done from the *sound* Vera Cruz, viz. 19 per cent., but only 10 per cent. of the aqueous extract. The next question which suggested itself was whether this and similar resins could be (following the Pharmacopœia directions) as well prepared with methylated as pure spirit? Judging from two samples on the table, I should say not. Although subjected to distillation, subsequent washing with hot water, and evaporation in an open vessel, these resins still most tenaciously retain the unpleasant methylic odour, but which is almost got rid of by subsequent digestion with a small quantity of pure spirit and animal charcoal, and repeated washings with hot distilled water.

There is yet another circumstance, I think, worthy of being mentioned in reference to a test for jalap resin. In the 'Pharmaceutical Journal,' vol. iv., 1st series, p. 326, writing upon jalap, Dr. G. Kayser says, "The relation of jalap resin to concentrated sulphuric acid furnishes us with the means of testing these resins. We have only to moisten a little of the powdered resin in question with a few drops of concentrated sulphuric acid upon a watch-glass, and allow it to stand for a quarter of an hour. If it be pure jalap-resin it will be gradually dissolved, assuming a beautiful crimson colour, and in a few hours a brown viscid resin will separate." He continues, "I have made the same experiment with common resin, *with scammony*, etc., but none of these evinced the characteristic relation towards concentrated sulphuric acid, which is, therefore, an infallible test for jalap resin." Here I am desirous of showing that, though the sulphuric acid test distinguishes jalap resin from some other resins, it does not distinguish it from that of scammony. It will be clearly observed from the watch-glasses upon the table—the one containing jalap resin, and the other scammony resin—that the rose colour is so similar that it would be impossible to tell the one from the other. The inferences to be drawn from the foregoing appear to be:—

That the P. B. process for the preparation of jalap resin is good; that worm-eaten jalap certainly possesses no advantage over sound jalap, but rather the contrary, for the preparation of resin of jalap; that good Tampico jalap is a valuable substitute for the Vera Cruz; that methylated spirit is objectionable in the preparation of this and similar resins or extracts; and that concentrated sulphuric acid is not a distinguishing test between jalap and scammony resin.

Mr. Tilden remarked that the chemistry of jalap and scammony resins had been pretty completely worked out. In a paper published a short time ago by Spirgatis, a comparison is made of the composition and properties of scammony resin with those of that portion of jalap resin which is soluble in ether. They give the same results to analysis, and by the assimilation of three atoms of water yield resinous acids furnishing salts which are identical in properties. When treated by acids, they split into glucose and a new acid which is crystalline. They also give the same coloration with sulphuric acid. Their chemical characteristics corresponding thus closely, it was thought probable that the active principles of scammony and jalap are identical, particularly as the plants yielding them belong to the same Natural Order.

ON THE CONSTRUCTION OF A PHARMACOPŒIA.

BY PROFESSOR REDWOOD.

It is probable that, before long, a new edition of the British Pharmacopœia will be produced, and it is very desirable that whatever means may occur to those most interested in the subject for increasing the usefulness and value of the work, should be pointed out and discussed before the new Pharmacopœia is committed to the press. With the view of promoting this object, I venture to submit a few points for discussion this evening.

1. *Arrangement and Classification of Matter.*—In looking at the Pharmacopœia for the purpose of considering what changes may with advantage be made in a future edition, the first and most obvious character that presents itself to notice is that of the arrangement of matter and the general construction of the work. Viewing the Pharmacopœia as a medium of communication between prescribers and dispensers of medicine, as the authorized exponent of the value and meaning of the terms to be employed in extemporaneous prescriptions, it is important that it should not only supply the required information, but should admit of easy reference, and that all the information it may be thought necessary to give relating to any article, should be presented at once in a connected form to those who have occasion to seek it. The division of the Pharmacopœia into two parts, one containing the Materia Medica, and the other the preparations and compounds, is an arrangement, as adopted in modern Pharmacopœias, that is neither correct in regard to classification, nor convenient in practice. Strictly speaking, the preparations and compounds belong to the Materia Medica as much as do the articles used in producing them ; and while the term Materia Medica is thus incorrectly restricted to the substances hitherto described under this head in our Pharmacopœias, it may equally be said that many articles included in the Materia Medica belong to the class of Preparations and Compounds. If we turn to the early Pharmacopœias of the seventeenth century, we find that the substances comprised under the head of Materia Medica were, with very few exceptions, natural products, not in a fit state for administration in medicine, and requiring preparation in a variety of ways to render them suitable for that purpose. But the Materia Medica part of our Pharmacopœias has long ceased to consist merely of a list of crude drugs. Many medicines prepared for use have from time to time been transferred from the second to the first part of the work, and this has been promoted by the extension of chemical manufactures, which has caused many chemical compounds to be produced in a state of greater perfection, and more economically on the large scale, than they could be by those who use them in dispensing, so that it has been thought desirable to omit the processes for such compounds and to include them in the Materia Medica.

In several of the recent foreign Pharmacopœias, such as the Pharmacopœa Borussica, Pharmacopœa Austriaca, and Pharmacopœa Norvegica, all the articles ordered, excepting those to be used as reagents or tests, are included in one category, and are arranged there in alphabetical order. This appears to me to be not only the most simple, but in every respect the best arrangement for a Pharmacopœia. It obviates all difficulties of classification, and presents the greatest facility that can be afforded for reference. The work is used like a dictionary, and is its own index. Every article is described under its proper name, and being found in its place, all the information given respecting it will be found there. The object of a Pharmacopœia being to define as clearly as possible all the articles to which it refers, to enable the prescriber of medicines to know their composition, and the dispenser to provide them in the conditions in which they are intended to be used, all these agents are thus brought into one category. The definition or other information given, may, in some cases, consist of natural historical facts, together with physical and chemical characters and properties; while in other cases there may be, in addition to these, a description of the methods by which the articles may be obtained in the exact state described; yet the ultimate object in all cases is the same. In carrying this plan out, however, it may be desirable in some instances to insert the name of an article in more than one place, either for facilitating reference or for the purpose of classification. The mere adoption of the alphabetical arrangement would bring all preparations of a sort together, just as they are now brought in the part of the work containing the Preparations; but, besides this classification of preparations under the respective heads of Aquæ, Cataplasmata, Confectiones, Decocta, Emplastra, etc., which is convenient for the use of pharmaceutists, there is another, perhaps more important to the medical man, which is to have appended to the account of every medicinal agent a list, alphabetically arranged, of all the preparations, or different forms for administration, containing it. Thus, taking the first article in the Materia Medica, *Gum Acacia*, the description of this would be followed by a list of preparations containing it, and this might, with advantage, indicate the proportions in which it is present in each preparation. In this way, under *Gum Acacia* we would have

Preparations containing Gum Acacia.

Mistura Cretæ	1 part in 34
Mistura Guaiaci	1 part in 85
Mucilago Acaciæ	1 part in 2½
Pulvis Amygdalæ compositus . . .	1 part in 13
Pulvis Tragacanthæ compositus . .	1 part in 6
Etc. etc.	

The only fact stated here with reference to any of the preparations in the list, would be the proportion in which the medicine, in connection with which the list is given, is contained in such preparations. In other respects, and also in this respect in another form, all the required information would be found where each preparation is described under its proper Latin name, in its alphabetical place. Thus, *Mistura Cretæ* would be found among the Misturæ, and *Mucilago Acaciæ* among the Mucilages. This plan differs from that adopted by Mr. Squire in his 'Companion to the Pharmacopœia;' his arrangement being such as is often used in, and is found suitable for, works on Materia Medica, while this appears to be better adapted for a Pharmacopœia.

2. *Language and Nomenclature.*—Although some persons were at first disposed to doubt the expediency of publishing the Pharmacopœia in English instead of Latin, there appears now to be but one general feeling of approval with reference to this change. The work is written and retained in the language best known to its authors and to those for whose use it is intended. Under such circumstances there can be no excuse for any want of accuracy, fulness, and precision, in the descriptions given.

With regard to the nomenclature best adapted for a Pharmacopœia, there will no doubt be some differences of opinion. It appears to me desirable, as far as possible, to avoid the use of chemical names or symbols that are liable from time to time to be altered as new views in chemical science prevail. Frequent change in the names applied to medicines is in itself an evil. The most important objects to be attained are, that the names shall be familiar, concise, and explicit, easily pronounced and used both in English and Latin, consistent one with another, and not inconsistent in their signification with those used for other purposes. Names already in use, if they fulfil these conditions, are preferable to new names. The nomenclature of the Pharmacopœia should, as far as possible, be adapted for all time, and such a nomenclature, if once established, should not be rashly changed or altered. It is obviously useless, therefore, to attempt a scientific nomenclature, especially in the chemical part of the Pharmacopœia, for such a nomenclature is constantly changing, and is often very deficient in some of the qualities required. The changes in the names applied to calomel and corrosive sublimate were the most serious errors of this description committed in the preparation of the British Pharmacopœia; but it is satisfactory to find that with this exception there are very few names in the whole work that have been objected to. The names applied to the preparations of iron, and, with the exceptions named, to those of mercury, potassium, etc., are perhaps as good as could be given for the purpose contemplated. In two or three instances, however, a slight change might be suggested. Thus, as emetic tartar is very suitably called *Antimonium tartaratum;* Rochelle salt might consistently have been called *Sodium tartaratum*, but I should prefer the name *Soda tartarata*, as being more in accordance with other names applied to the sodium and potassium salts. The names that have been given to calomel and corrosive sublimate cannot be left as they are, and yet it is desirable not to make more change than is necessary. There are hundreds of prescriptions in daily use in which calomel is ordered under the name of *Hydrargyri Chloridum*, and this should, at any rate, be retained as a synonym for *Calomelas*, and ought on no account to be used to represent corrosive sublimate. The name *Hydrargyri Subchloridum*, which, as well as *Calomelas*, is given to calomel, appears to me to be unobjectionable, and would perhaps be the best that could be used where the familiar name *Calomelas* is objected to on account of its being too easily understood by patients. The name *Hydrargyri corrosivum sublimatum* is objectionable on account of its length. It might be shortened by omitting the first word (*Hydrargyri*), and it would then correspond with *Calomelas* in representing the familiar English name of the substance; but this, while in some respects it is an advantage, is subject to the objection already stated, that it is too easily understood by patients. If the name *Hydrargyri Chloridum* be restored to its former place, and put as a synonym for *Hydrargyri Subchloridum*, how are we to represent corrosive sublimate as a chloride of mercury? It is not desirable to return to the use of the name *Hydrargyri Bichloridum*, because this involves a theory, to which, if we are to have a permanent nomenclature, it is necessary that we should not be committed. The name subchloride, applied to calomel, indicates its position among the chlorides of mercury, as containing the smaller proportion of chlorine. It is preferable in this respect to the name chloride, as being more explicit, and leaving no doubt as to which of the chlorides is meant. I would suggest that the name *Hydrargyri Perchloridum* should be applied to corrosive sublimate, the prefix *per*, as used in such a case, being perfectly well understood to signify the compound containing the largest proportion of chlorine. It is unimportant to inquire whether chemists are accustomed to represent two compounds occupying the respective positions of calomel and corrosive sublimate, the one as a subsalt and the other as a persalt. Our object here should be not so much to assimilate our nomenclature to that of the scientific men of the day, as to adopt an explicit and a convenient nomenclature which is founded as little as possible upon mere theory. We know nothing of the atomic constitution of these bodies, but we do know the relative proportions of their constituents. It is desirable to have names for these chlorides that shall assimilate them with the other compounds of mercury, and by which they may be included consecutively with the mercurials in an alphabetical list of Materia Medica, and such names we have in *Hydrargyri Perchloridum* and *Hydrargyri Subchloridum*. These names would correspond with those used for other similar compounds in the Pharmacopœia, such as perchloride of iron and subacetate of lead. There ould never be any doubt as to which of the chlorides of mercury was meant by ither of these names, and they would sufficiently fulfil, in other respects, the requirements of a nomenclature for pharmaceutical or medical purposes.

In the case of the nitrate of bismuth, which is at present called *Bismuthum album*, I would suggest that this name be changed to *Bismuthi Subnitras*.

Next to the names applied to chemical compounds in the Pharmacopœia, we have to consider the best means of representing the composition of such bodies. The mere name of a substance fails in most instances to give a precise representation of its composition, and this is very frequently and conveniently supplied in chemical writings by the use of a symbolical formula in addition to the name. Such a formula defines a body much more precisely than usually can be done by any short and simple verbal description. But this method of chemical notation aims at a representation not merely of the composition, but also of the constitution of bodies, and being altogether founded upon theoretical data, the practice of chemists in reference to it is subject to frequent changes as new views are adopted. This constitutes the objection, which appears to me a valid one, to the use of such formulæ in a Pharmacopœia. At the present time especially, it is well known that a great change is taking place in the system of notation adopted by chemists. The new method which is being introduced, although sanctioned by the highest authorities, is but partially adopted, and there are many important differences in formulæ used by some even of our most eminent chemists. Are we to represent water by HO or by H_2O? Is nitric acid NO_5,HO, or H,NO_6, or HNO_3? Is sulphuric acid SO_3,HO, or H,SO_4, or H_2,SO_4? Is oxalic acid $C_2O_3,3HO$, or $C_4H_2O_8,4HO$, or $C_2H_2O_4,2H_2O$? Is caustic potash KO,HO, or KHO? Should sal-ammoniac be represented by NH_3,HCl, or by NH_4,Cl? Should liquid ammonia be represented by NH_3,HO, or by NH_4O, or by NH_3,H_2O, or by NH_5O?

Besides other objections and difficulties that stand in the way of maintaining a strictly scientific nomenclature, and selecting the best among the various methods of representing the composition of chemical compounds by symbolical formulæ in the Pharmacopœia, there is one that appears to me worthy of consideration, which is, that whatever method is adopted must necessarily be received and adopted by Pharmaceutical Chemists, and especially by pharmaceutical students, thus tending often to the exclusion of other approved methods, and tending to limit the course of chemical study. If, for instance, the composition of water, nitric acid, caustic potash, calomel, corrosive sublimate and alcohol, be represented by HO; NO_5HO; KO,HO; Hg_2Cl; $HgCl$; and C_4H_5O+HO; with scientific names corresponding with these formulæ; pharmaceutical students would find it necessary to learn a system of chemistry that accords with such a nomenclature and notation. They may thus to some extent be restricted from the study of chemistry as taught by eminent chemists, because this would clash with the theories involved in the chemistry of the Pharmacopœia, and a clashing of ideas in the meaning of names and symbols used in the practice of Pharmacy might be productive of much inconvenience and mischief. It appears to me desirable, with reference to nomenclature and notation, that the Pharmacopœia should occupy neutral ground, as far as this can be done consistently with other objects which are required to be fulfilled.

But if it should be determined to avoid the use of chemical names and symbols, such as are used by scientific chemists, what means are left to us for defining the composition of the substances of this class that are intended to be used in medicine? We may give the composition of the substances as determined by analysis. It is upon the results of chemical analysis that symbolical formulæ themselves are founded. The analysis gives the proportions of the different parts of a compound, and this is all we can learn in this direction with any certainty. What is done beyond this, and founded upon it, is the result of theory. We assume an atomic constitution of the body, and represent the atoms by symbols, but of this we have no certain knowledge, and hence the changes that are frequently taking place in prevailing opinions on the constitution of chemical compounds, and the means of representing them by symbolical formulæ. There are no material differences among chemists with regard to the *composition* of chemical compounds, analytical means being sufficiently exact to place the results beyond question, but great differences often arise when attempts are made to represent such results by atomic formulæ. It must be admitted that an atomic formula, when adopted, affords a more clear and precise indication of what is intended to be conveyed than can be shortly communicated in any other way, but the completeness of its representation is sometimes an objection to its use. Thus, for instance, if we use the symbol SO_3,HO for oil of vitriol, we either use it incorrectly, or we indicate as oil of vitriol a body that cannot be obtained in commerce. The symbol in such a case is too precise in its signification, or in other words, the liquid represented is not a perfectly definite chemical compound, and a chemical formula is therefore inapplicable to it. There are many chemical substances used in medicine that are not in such a pure and definite state as to admit of their being correctly represented symbolically; yet these, or at least some of them, may have their composition given as determined by analysis. The representation of composition in parts by weight is therefore more extensively applicable than atomic representation. Still, it cannot be denied that symbolical formulæ, where applicable, afford great assistance in conveying a clear perception of the composition of bodies, and this cannot be equally well conveyed in any other way. If we take the analyses of two compounds, such as calomel and corrosive sublimate, and compare them together in the form in which analyses are usually expressed,—that is, in centesimal parts,—we do not observe that simple relationship between the two bodies which is shown by their symbolical formulæ; nevertheless, in the one case we have the result of observation, and in the other of reasoning; moreover, the reasoning is founded upon assumed data which are not within our means of observation. In such cases, however, we may render the existing relationship between the bodies more obvious, by giving proportional numbers corresponding with the atomic weights, in addition to the centesimal quantities. We may thus give the composition of the chlorides of mercury as follows:—

	Calomel.			*Corrosive Sublimate.*		
Mercury,	200	or	84·92 . . .	200	or	73·80
Chlorine,	35·5		15·08 . . .	71		26·20
	235·5		100·00	271		100·00

It is obvious here that the quantity of chlorine combined with two hundred parts of mercury is twice as great in the case of corrosive sublimate as it is in that of calomel, so that this simple relationship between the two bodies is shown; but the two hundred parts of mercury may represent either one atom or two atoms. What is gained by the adoption of this method is, that nothing is stated but the result of experiment, and this is reconcilable to any of the received theories of the constitution of the bodies. If something is lost in explicitness by omitting the use of the symbols, there is at least a clear gain in the unimpeachable character of what is stated.

It must not be supposed that I am here advocating or suggesting the disuse of scientific names and symbolical formulæ by Pharmaceutical Chemists, but only their disuse in the Pharmacopœia and in physicians' prescriptions. If the Pharmacopœia describes red oxide of mercury under the name of *Hydrargyri*

Oxidum rubrum; if it gives a process for its production by decomposing nitrate of mercury with heat, which serves to distinguish it from the oxide of similar composition obtained by precipitation; and if, together with its characters and tests, it states what its composition is in parts by weight,—all the information is given that need be given in a Pharmacopœia, and there will be nothing in what is stated that will clash with any received theories, or require alteration to reconcile it to any system of nomenclature or notation. Its pharmaceutical name is red oxide of mercury, and its composition is—

Mercury . . .	200	or	92·6
Oxygen . . .	16		7·4
	216		100·0

In addition to this name, by which alone it should be used in medicine, the pharmaceutist may, and indeed should know, that scientific chemists sometimes distinguish it as protoxide of mercury, and sometimes as binoxide of mercury, names which are inconsistent with each other; and that it is sometimes represented by the symbol HgO, and sometimes by HgO_2. A chemist in one part of the country, or in some particular school, may have been instructed to call it protoxide of mercury, while another calls it binoxide of mercury; but all can, with equal propriety, and without violating their received and adopted theories, employ the name given in the Pharmacopœia, and no one can gainsay the representation given of its composition. The name and composition thus assigned to it will be good for all time.

This is the kind of nomenclature that I should like to see generally adopted in the Pharmacopœia, and the changes that have recently been made are quite in that direction. There are, however, many names used that are of a different description, and which, as we have now become accustomed to their use in medicine, it would perhaps be best to leave unaltered, for unnecessary changes ought to be avoided.

3. *Weights and Measures.*—Much has been said and written on this subject, and many different opinions have been expressed with reference to the weights and measures thought to be best suited for use in pharmacy. In actual practice the weights used in the British Pharmacopœia appear to have proved unobjectionable. They are those which alone are used in buying and selling drugs, and every druggist is provided with them to every required extent; they are better understood, and more familiar than any others to those engaged in making our Pharmacopœia preparations, for which purpose they are fully applicable as ordered; and therefore they appear to be those best suited for use in such operations. I believe the adoption of the avoirdupois ounce and pound, in place of the Troy weights of those denominations, is calculated to promote a more uniform and correct preparation of the medicines ordered in the Pharmacopœia by those druggists, of whom there are many, who do not keep complete sets of Troy weights beyond the small weights required for dispensing. But, although the avoirdupois weights with the Troy grain answer every purpose required for the processes of the Pharmacopœia, it does not follow that they are equally applicable for prescribing and dispensing medicines. For these purposes the apothecaries' weights with their symbols are much better adapted. The grain, scruple, and drachm, apothecaries' weight, are not only well understood, but are well suited for indicating the quantities of medicines ordered in prescriptions. With reference to this application, the quantities represented by these weights, and the relations they bear to each other, are, if not the best that could be devised, at least the best that have yet been introduced or suggested. The symbols are also better than any others that have been suggested. They are easily written, perfectly characteristic, and readily distinguished, not only from each other, but also from other parts of the writing of a prescription.

4. *Medicines having a claim to Recognition in the Pharmacopœia.*—With every new edition of the Pharmacopœia the question must arise, what medicines are to be included in its descriptions? Some persons seem to think that the Pharmacopœia ought to contain a selection only of the best and most approved medicines, while others contend that all drugs and preparations established in use by legally-qualified medical men ought to be recognized in a national Pharmacopœia. It may be inferred, from the general character of the complaints made when new editions of the Pharmacopœia are brought out, that the latter opinion prevails over the former, and that it would be better and safer, with a view to popularity, to err on the side of a liberal introduction of established medicines rather than on that of too critically investigating the merits of suggested remedies with a tendency to their exclusion. The official publication of well-devised forms for the administration of medicines in common use cannot be otherwise than useful, tending, as it must tend, to maintain uniformity in the composition of medicines, and to enable medical men more correctly to trace effects to their true causes. There are many medicines now in use that are not at present included in the Pharmacopœia, and men having the experience possessed by some of our members might contribute important information by showing the position of such in medical estimation, and the claims they have for official recognition. Nor is this the only sort of assistance that pharmaceutists are capable of rendering in preparing for the publication of a Pharmacopœia. There is something to be done in suggesting improvements in the forms for the administration of medicines, for we surely have not attained to perfection in this respect. Are we always to be restricted to the old forms of greasy ointments, fat unctuous plasters, inelegant confections and boluses, unstable infusions and offensive liniments, or may we not look for improvements upon these and other forms of administration? I have heard the opinion expressed by some distinguished physicians, that the efficacy of medicines might be greatly increased, and their use extended, by giving them a less repulsive character,—in fact, by depriving them as much as possible of the qualities which in past ages characterized most pharmaceutical preparations. Much improvement has already been effected in this direction, but much still remains to be done.

May we not look upon the use of medicines as bearing some analogy to the use food, as far as regards the relation of effects to forms of administration? We know that the same amount of food may be made to produce very different effects according to the processes to which it has been subjected and the forms in which it is administered, and does not the same hold good with reference to medicines? In therapeutics, as in dietetics, there is not only the choice of materials, but there is a very important art to be exercised in giving to these materials the plastic condition upon which their efficacy greatly depends. In some respects, indeed, dietetics and therapeutics are closely allied, so that it would be difficult to say where the one ends and the other begins; but the art of preparing food has certainly been carried to a higher state of perfection than that of preparing medicines. How great is the influence often of the skilful exercise of the culinary art! Most efficient means are thus provided by which exhausted animal powers are restored, and new strength and vigour given where these have failed. In the study of the combinations by which these effects are produced, is there no instruction to be gained that may be turned to profitable account in the improvement of the art of pharmacy?

But if the improvements in the pharmaceutic art have not been all that we could wish, still some progress has been made, and some new forms for the administration of medicines have been introduced into practice, although not yet made officinal. Thus, we have the *effervescent*, and the *granular*, and the *granular effervescent* forms, in which many medicines are now administered; but I cannot say in all cases with what amount of success or advantage as compared with other forms of administration. There can be no doubt, however, that both the public and the medical profession have long and fully appreciated the benefit that was conferred on medicine by the introduction of the "Seidlitz powder," which was the first important step taken in this direction. Art was here applied to imitate nature, for the effervescent forms are but imitations of the sparkling saline waters of mineral springs, which in all ages have been held in high repute for their curative properties. I should not wish it to be thought, however, that I am prepared to advocate the introduction into the Pharmacopœia of all the preparations of this sort that the ingenuity of some of our brethren has devised. All that I would suggest is, that whatever is good and essential be sought out from among the varied extrinsic qualities which are given to such preparations for mere trade purposes. Thus, for instance, in the granular effervescent preparations, is there not a definable basis underlying the whole series, which, in its most eligible form, might be used as a simple effervescent saline, to which, as occasion requires, more active additions might be made?

The form of *Lozenge*, again, is one the use of which for the administration of medicines seems to promise successful extension, and this is one of the methods adopted for giving as agreeable a character as possible to an otherwise disagreeable dose.

In external applications, also, some improvement has been made. The old form of ointment has often been referred to as one calling for improvement; for what can be more offensive than a rancid unguent smeared over the skin? The so-called *Plasma*, which was introduced by Mr. Schacht, of Clifton, in 1858, is certainly a great improvement in elegance and the absence of repulsiveness upon the forms previously used for similar purposes. This plasma, which is a solution of starch in glycerine, has now been in use for several years, and there appears to be but one objection to it, which is that, if exposed to the air, it absorbs moisture, and is then liable to become mouldy. But it has several recommendations, and it will probably come into more general use as it becomes more extensively known.

May we not also extend the application of glycerine in medicine? Several suggestions have been made with this object by Mr. Haselden and others, and there are some preparations on the table, which have been kindly furnished by the Chairman, that serve to illustrate the practicability of such suggestions. Glycerine is not only a very efficient solvent of many active medicinal agents, but it also tends to preserve some of those that otherwise are subject to change. It dissolves and preserves tannic acid, and is a very good solvent for gallic acid. It has also been suggested as a vehicle for carbolic acid. Gallic acid, as is known, is but slightly soluble in water, but it dissolves in glycerine to the extent of 25 per cent.

If glycerine is to be thus used, it is desirable that we should have some name that could be conveniently applied in pharmacy as a generic name for solutions where it is employed as the solvent. Some names have been already proposed, but none of them appear to me to be unobjectionable. Solutions in glycerine have sometimes been called *glyceroles*, but this name is suggestive of a property the reverse of that which glycerine imparts. *Glyceroleum* cannot therefore be considered a suitable generic name for a class of preparations distinguished from *olea* and *unguenta* by the possession of entirely different characters. Then we cannot call them *glycerides* or *glycerates*, because these names are already appropriated as chemical names, having different significations from those here intended. I would suggest that the name *glycemate* might be suitably used for these preparations. This name has not yet been appropriated that I am aware of, and it seems to fulfil what is required. The word *glycemate* would be *glycematum* in Latin, and this would apply to solutions of substances such as I have named in glycerine. The solution of starch in glycerine, Mr. Schacht's *Plasma*, would be *Glycematum Amyli*, *glycemate of starch*. Under this name it would be included among other solutions in glycerine; but as this glycemate of starch may itself become the basis of a class of external applications, while others of the *glycemates* are applicable for different purposes, it would be desirable to have a name that could be used as a generic name for preparations of glycemate of starch with more active ingredients. Thus the glycemate of starch forms a good vehicle for the application of aconitia, atropia, etc., and what name should be applied to such? I would suggest that the name *Glycematum Amyli* should be abbreviated into *Glycemylum*, which would be a synonym for glycemate of starch, and a generic name for preparations consisting of what is now called Plasma, with the addition of other substances.

We should thus have—

GLYCEMATUM AMYLI, Glycemate of Starch. *Synonyms*,—*Glycemylum*, glycemyle, Plasma. Solution of starch in glycerine.

GLYCEMATUM ALOES, Glycemate of Aloes. *Synonym*,—Glycerole of Aloes. Solution of aloes in glycerine.

GLYCEMATUM BORACIS, Glycemate of Borax. Solution of borax in glycerine.

GLYCEMATUM CARBOLICUM, Carbolic glycemate. Solution of carbolic acid in glycerine.

GLYCEMATUM GALLICUM, Gallic glycemate. Solution of gallic acid in glycerine.

GLYCEMATUM TANNICUM, Tannic glycemate. Solution of tannic acid in glycerine.

And then we might have—

GLYCEMYLUM, Glycemyle. *Synonym*,—Plasma. Solution of starch in glycerine.

GLYCEMYLUM ACONITIÆ, Glycemyle of Aconitia. Solution of aconitia in glycemyle.

GLYCEMYLUM ATROPIÆ, Glycemyle of Atropia. Solution of Atropia in glycemyle; etc. etc.

This and other parts of the subject would admit of considerable amplification; but the statements I have made will perhaps serve to explain what I wish to communicate, with the view of eliciting from others their opinions or such suggestions as they may be disposed to offer.

The CHAIRMAN said the subject of the paper just read was a very important one; and the announcement that another edition of the Pharmacopœia might be expected before very long, would be received with satisfaction. It was the duty of those who had the means of doing so to afford such assistance as they were able to give in making the work more practical and useful, and he hoped the discussion of the subject would tend to elicit some practical suggestions.

Dr. W. S. SQUIRE had listened with some interest to Professor Redwood's explanation of his views of what a Pharmacopœia ought to be. The subject was conveniently treated under separate heads, and he should be glad to make a few remarks on the several points alluded to. First, with regard to the arrangement of the matter, the Professor had alluded to the work published by his (Dr. Squire's) father, and said he did not think the arrangement adopted in that work the one best adapted for a Pharmacopœia. In this he begged to differ, for he thought when a medical man was treating a patient, he wished to know all the different forms of application provided for any article of the Materia Medica that he might wish to use. He was not likely to say, in treating a patient, "I must apply an ointment here, and therefore let me see what ointments are ordered in the Pharmacopœia;" but he would rather say, "I wish to apply belladonna; let me see what preparations of it there are." He thought, therefore, that the best arrangement was that in which the descriptions of all the preparations of an article were given in connection with the article itself. This was the arrangement in the 'Companion to the Pharmacopœia,' and it was at least convenient to prescribers of medicines. He did not think, however, with reference to many of the preparations ordered in the Pharmacopœia, that it was necessary or desirable to describe the processes for their production. There were a great many chemical products that were made only on the large scale by chemical manufacturers, and it was useless to attempt the description of the processes for such products in the Pharmacopœia. The best processes in such cases were kept secret, and the authors of Pharmacopœias could obtain but an imperfect acquaintance with them, which was of little or no use. Whatever processes for such products were given in the Pharmacopœia, did not affect the manufacture, for the manufacturer would pursue his own method in spite of what was thus recommended. With reference to the question of chemical symbols, he thought their omission would not be an advantage. It was asked, could we not substitute for the symbols, which are subject to change, proportions by weight, which would represent composition? He thought, however, that figures representing the analyses would give a very imperfect idea of composition. On the subject of weights and measures, his opinion differed so entirely from that of the author of the paper, that he would pass it over without further comment. Then came the subject of the introduction of new substances into the Pharmacopœia, which he thought involved considerable difficulty. It was no doubt desirable to include in the Pharmacopœia most established medicines, but unfortunately the pharmaceutists of the present day were, like the Athenians of old, always seeking for something new, and would it be possible to recognize all the new preparations that were brought out? Among the new forms of medicine alluded to, Dr. Redwood had particularly mentioned Plasma as a substitute for greasy ointments, but there were some points to be considered in connection with this subject, to which no allusion had been made. It must be recollected that Plasma would not mix with an ordinary ointment; and therefore, if a medical man wished to prescribe a medicine which was kept in the form of Plasma, and another that was kept in the form of ointment, the two could not be united. He believed also that glycerine in a concentrated state was rather irritating to the skin.

Dr. Waring said the subject under discussion was one in which he was greatly interested, for, as some present might perhaps be aware, he was one of those engaged in the preparation of a Pharmacopœia for India, and therefore necessarily had his attention directed to some of the points alluded to by Professor Redwood. He was not prepared, however, to enter fully into the discussion on that occasion, but hoped another opportunity might occur for doing so. With reference to the question of arrangement of matter, the opinion he had formed was, that it was desirable, in connection with each article of the Materia Medica, to have all the preparations of it described. He thought there had hitherto been a deficiency of information in our English Pharmacopœias.

Dr. T. Thomson, like his friend Dr. Waring, was much interested in this subject, which was one of very great importance, not only to the physician, but to all those interested in the administration of medicine. He also hoped the subject might be brought forward on a future occasion, when he might be better prepared to discuss it. He might remark, however, with reference to the subject of chemical symbols, that he did not see the difficulty alluded to by Dr. Redwood in their use in the Pharmacopœia.

Mr. Daniel Hanbury said he felt that it would be impossible to do justice to the subject before the meeting in the short time they had left for discussion, yet he was anxious to offer a few observations upon it. He considered the shortcomings of the 'British Pharmacopœia' to be so many, that it was satisfactory to find there was some prospect of an improvement being effected in the work, and there was no one better qualified for this duty than Professor Redwood. There were two classes of people who were greatly interested in a Pharmacopœia, namely, physicians and pharmaceutists, who desired to know the composition of medicines, and the best methods of preparing and identifying them. The object of the work was to supply this information to these two classes of persons, and he thought it undesirable to introduce extraneous matter. The Pharmacopœia was not intended to be a work for teaching chemistry, and still less botany and zoology, but for giving the necessary instructions for the preparation of medicines in the best, most efficient, and economical way; and the information given should be conveyed in plain language, that could be readily understood by those who had occasion to refer to it.

Dr. Edwards, of Liverpool, thought that those, like himself, who were engaged in teaching medical and pharmaceutical students, had some claim for a little consideration. They had to teach chemistry, and they would like to know what the chemistry of the Pharmacopœia was, or was intended to be. He had been accustomed to think that the Pharmacopœia was, or at least that it ought to be, the standard by which medical and pharmaceutical students were to be taught, and to which they were to look as their guide in practice; but when he expressed this opinion some time ago at a meeting of the British Association, he was told that pharmacy was not philosophy; and now again, on coming to the head-quarters of British pharmacy, he heard something very similar. He confessed he felt doubtful what course to pursue in future, if there was to be so little left in the Pharmacopœia to indicate what system of chemistry was recognized.

Dr. Attfield would have been glad if the subject could have been adjourned, so as to admit of a more full discussion on a future occasion; but even at that late hour he must beg to be allowed to say a word or two on behalf of the class of students. Hitherto the Pharmacopœia had been used as a textbook by pharmaceutical students, and this was at least one important application of it which ought not to be overlooked. It was true that the chemistry of the Pharmacopœia was sometimes at variance with that taught at the schools, and he had sometimes found it took as long to unteach the bad chemistry which apprentices had learnt as was afterwards required to teach them what they ought to know. It was perhaps better that the Pharmacopœia should not attempt to teach chemistry, than that it should teach what would afterwards require to be untaught. He hoped, however, if the Pharmacopœia was not to be a text-book for students, that such a work would be furnished in connection with it.

The Chairman said he was sorry the lateness of the hour did not admit of the discussion being extended, and as this was their last meeting for the season there would be no early opportunity for renewing it; but the 'Pharmaceutical Journal' was open for any communications, and Professor Redwood would also be glad to communicate personally with those who took an interest in the subject.

PHARMACEUTICAL SOCIETY, EDINBURGH.

The last scientific meeting of the present session was held in St. George's Hall on Monday evening, April 17th, at 9 o'clock; Mr. Kemp, President, in the chair.

The following paper was read by Mr. D. R. Brown, Vice-President, on "Chloroform, and the Tests for its Purity in the British Pharmacopœia:"—

Chloroform seems to have been first prepared by Graham, an American chemist, in 1831; but he was not aware of it. In 1820, Dr. Thomas Thomson gave the name of chloric ether to the compound known as Dutch liquid, the empirical formula of which is $C_4 H_4 Cl_2$. Somebody made a statement in Silliman's American Journal that a solution in alcohol of the so-called chloric ether was a grateful stimulant. It led Mr. Graham to attempt making it cheaply by the action of bleaching powder upon alcohol; and believing he had succeeded, he published his results, and gave a formula for its preparation in solution in alcohol. He was, however, under a mistake; what he did get was just an impure and somewhat weaker chloric ether of the present day,—that is to say, a solution of chloroform in alcohol, a solution of the compound $C_2 H Cl_3$, and not, as he supposed, of $C_4 H_4 Cl_2$.

Soubeiran, in 1831, distilled bleaching powder and alcohol together; examining the product he discovered chloroform, and gave as its formula C H Cl or $C_4 H_4 Cl_4$, and thus held it to be Thomson's chloric ether *plus* another double atom of Cl, and therefore named it Bichloric ether.

In 1832 Liebig also discovered and examined chloroform. He failed, however, to find hydrogen in it. Not much to be wondered at, as 119½ grains contain no more than one of Hydrogen. The formula given by him was $C_4 Cl_5$, and he named it chloride of carbon.

Dumas, in 1834, entered more carefully into its investigation, and as the result gave for its formula $C_2 H Cl_3$, and named it by its present well-known designation, Chloroform. Liebig, however, while he accepted Dumas's formula, held it to be the perchloride of the radical formule $= C_2 H + Cl_3$ and so named it the perchloride of formule. We may notice here that a compound with the same name differently spelt, said to be $C_4 H_2 Cl_4$ is described in vol. ix. of Gmelin's Chemistry, pp. 199, 200, as 'the so-called Perchloride of Formyl.'

Since Dumas's investigation, and perhaps very properly following upon Professor Simpson's discovery, almost the whole attention bestowed upon chloroform has been given to its anæsthetic properties, and its chemistry has been very nearly set aside. At this moment it has different names, and is variously formulated; its specific gravity is given by some as 1·484, and by others up to 1·500; the changes it undergoes by what we call spontaneous change, and by reagents, are either not at all or ill-understood, and the chemistry of its production from bleaching powder and alcohol, etc., is yet to be brought out. We need not wonder, therefore, that its characteristics and the tests given for its purity should be found somewhat amiss. The tests given in the British Pharmacopœia are four—1st, the specific gravity 1496; 2nd, "not coloured by agitation with $S O_3$;" 3rd, it leaves after evaporation no residue and no unpleasant odour; 4th, 'evolves no gas when potassium is dropped into it.' It is to the last of these that your attention is to be more particularly called, but a few words upon the others may be advantageous.

First, then, as to specific gravity. A perfectly pure chloroform will give a gravity of 1·500, and perhaps a very little above that; but for a commercial article, well and carefully manufactured, 1·496 is a perfectly fair standard. As it is sent out by manufacturers at present, we believe you will always find it to be from 1·498 to 1·500. Certainly anything below 1·496 ought to be held wrong. Here the editors of the 'British Pharmacopœia' proceed upon a sound principle; eschewing that myth, 'absolute chemical purity,' they allow a fair margin, and no more; but, as we shall see, it should have been allowed all through.

The second test, "not coloured by agitation with $S O_3$," is unfortunately worded. An impure chloroform agitated with $S O_3$ colours, and that deeply, the $S O_3$, while the chloroform itself is left colourless, or all but colourless. It may be almost certainly held that what is meant is, that when agitated with $S O_3$, it gives no colour to the $S O_3$. "Colourless," however, must be taken *cum grano salis*. A well-prepared chloroform will stand the test, provided the search for colour be made by transmitted light; but scarce any can be found which will not show a very faint tint in the $S O_3$, if a piece of white paper be put behind the tube. Moreover, the test requires precaution in its use. A somewhat dirty tube; one cleaned with a woolly cloth, off which some fibres are left behind; the contact of the finger if employed to close the tube while agitating the fluids; or some organic substance accidentally present,—will all give more or less colour to the acid. With the precautions mentioned, the $S O_3$ test is a perfectly fair and most useful one. One other caution may be proper here, and that is, do not return the sample tested with $S O_3$ to the stock; Chloroform twice treated with $S O_3$, Christison states, is likely to decompose.

The third, that it "leaves after evaporation no residue, and no unpleasant odour," is, for the Pharmaceutical Chemist and the physician, the most important of them all; but it needs a few words regarding the olfactory part of it. It is only a very impure chloroform that will *leave*, in the ordinary sense of the word, any unpleasant odour after its evaporation; and sometimes it happens that what is left, is of a rather pleasant flavour. And again, when chloroform, containing only a minute quantity of those deleterious oils formed with itself in the process of its preparation, is left to evaporate from a clean cloth or vessel, it is only at the last moment their offensive smell is felt; and if the sense of smell is not delicate and on the closest watch, it will not discover the taint, for it passes off *instantly*.

We come now to the fourth test given, it "evolves no gas when potassium is dropped into it."

About three weeks ago we got notice, from one of the most respectable houses in London, that the chloroform we had sent them did not stand the potassium test of the British Pharmacopœia. From the first we held the test to be inapplicable, and such as, with the specific gravity given in the British Pharmacopœia, ought not to be applied to it. We have the authority of Gregory and others that the specific gravity of pure chloroform is 1·500, and our own experiments assert the same thing. A specific gravity of 1·496, then, could only be the truth when the chloroform contained alcohol or water, or both; and to admit into the Pharmacopœia a chloroform containing those fluids, and then to apply a test for them, and reject the chloroform because they were present, seemed to us contradictory, and what could not have been the intention of the editors. We accordingly wrote our friends to the above purpose, and telling them that we did not believe any commercial chloroform could or would stand the test. It was thought well, however, to examine the matter a little more closely.

A perfectly pure chloroform was very carefully prepared from alcohol by the process given in the B. P. Its specific gravity was 1·500; it gave no colour to SO_3; left no residue or odour of anything after evaporation, but it yielded gas with potassium. Specimens of chloroform were got from various makers, and others were prepared from acetone and methylated spirit, and one and all tried by the potassium test *gave off gas*. At first the evolution of the gas was rapid, but very soon became slower, and a white crust was formed on the metal. On removing that crust the gas was again rapidly produced. Sodium acted like potassium. The collection and examination of the gas presents a number of difficulties not very easily overcome: the use of water is out of the question; mercury is liable to explosive amalgamation with the K or Na; other fluids present other incompatibilities with the necessities of the case, and we can only manage well when our pneumatic trough is filled with chloroform; and that, besides being rather an expensive fluid to work with, gives off its own vapour with the gas, and so complicates the result.

The gas got by the action of Na on chloroform, and before washing it with water, burns with a yellow flame, somewhat smoky, and sometimes with a tint of green at the edges; and mixed with about its own bulk of air and a light applied, it explodes with almost no violence, leaving sharp acrid acid fumes in the jar. A little water shaken with the vapour left in the jar after explosion is distinctly acid to litmus, and gives with $AgNO_5$ abundant evidences of chlorine. On washing the gas with water some absorption takes place, and it then burns much more like Hydrogen, explodes more violently with air, and leaves less acid and chlorine in the jar. It is far too soon yet to say what the gas is or is not; so far as we have seen, however, it may be Hydrogen with the vapour of chloroform diffused through it, and due to water, or alcohol, in the chloroform. But an examination of the crust formed on the Na sets that aside, for it almost wholly consists of $NaCl$, which, under the circumstances, can only derive its chlorine from the decomposition of chloroform, or some other fluid containing chlorine mixed with the fluid called chloroform, as that is got by the B.P. and other processes. That last supposition is not likely to be the truth, but whether it be so or not it still leaves potassium inadmissible as a test; for whatever the fluid is, it is produced according to the given formula. Our belief, however, is that chloroform is one fluid, and that it is decomposed both by Potassium and Sodium.

How the error has arisen we cannot say, but the authors of the 'British Pharmacopœia' are not singular in their belief as to the non-evolution of gas from chloroform by the action of Potassium; for Liebig, as quoted in Gmelin, says that chloroform distilled over Potassium is not decomposed; and Heintz also, as quoted by Watts in his 'Dictionary of Chemistry,' states that chloroform is not decomposed by Sodium even when heated with it in a sealed tube to 200° Centigrade. In the experiments made before you, Sodium decomposes it at natural temperatures as you have seen, and so also does Potassium.

The only other matter worth mentioning is, that the crust formed on the Na is not wholly NaCl; it gives up something not yet examined to dry alcohol, and effervesces on the addition of HCl, and is strongly alkaline to litmus-paper. It is, when got of a grey colour and in fine powder, soluble in water, giving a brown saline substance when again evaporated down. Heated to redness it is soluble in water, and leaves in the filter a small quantity of what looks like charcoal, and its solution effervesces more on the addition of acid than it did. These last facts point to the formation of an organic acid.

The paper was illustrated with various experiments, all of which were most successful, and established practically the correctness of the statements made.

Mr. Nicol proposed, and Mr. Stephenson seconded, a vote of thanks to Mr. Brown for his very valuable and able communication.

The following report by the Prize Committee was then read:—

Gentlemen,—As convener of the Prize Essay Committee, I have to report that only one essay has been received, the title of which is "Practical Hints on the Manufacture of some of our Ointments." Regarding the essay itself, the committee regret to say that they are not quite satisfied with the manner in which the subject has been treated, because it involves changes in the composition of many of the ointments, in suggesting which, the author appears to have forgotten the importance of uniformity, and that the British Pharmacopœia is now the only acknowedged authority for the pharmaceutist; while the committee are fully aware of the importance of improved colour, consistence, smoothness, and durability, they cannot approve of any unauthorized departure from established formulæ. The committee, however, are of opinion that, apart from this, the essay is not without merit; that the labour bestowed on the subject, the careful composition, and the correct observations, regarding the nature and qualities of a good ointment, deserve to be acknowledged, and, therefore, they have awarded it the President's Prize.—David Kemp, *Convener*.

On the sealed envelope being opened, the writer of the essay was found to be Joseph G. Steevens, residing with R. Jeffrey and Sons, Pittville, Cheltenham, and the Secretary was instructed to forward the President's Prize. This consisted of a copy of the late edition of Neligan, edited by Dr. Macnamara, of Dublin.

The President then proceeded to give his

VALEDICTORY ADDRESS.

Gentlemen,—Before we separate, I desire, in accordance with the usual practice, to make a few remarks on the business of the session, which I shall do very briefly.

Having accepted the responsibilities of office with some degree of hesitation, lest the Society should suffer by incapacity on my part, or from want of time to watch its interests with sufficient care, I have now, at the conclusion of my official term, to express the hope that this has not been the case. Of this, however, I must leave you to judge. All I ought to say is, that I have honestly endeavoured to prevent it, by doing my best to justify your choice of me as President, and rightly to discharge the various duties which devolved on me in that capacity. At the same time I am ready to acknowledge that there have been deficiencies in these respects, and that on several occasions I both needed and received your kind indulgence. I, therefore, regard it as fortunate, both for you and myself, that the events of the past year, in which we were called to take an interest as a society, were quite of an ordinary character, and not such as to require special qualifications on the part of the President; and also that the society is so well established as to render unnecessary any extraordinary efforts to defend its position or sustain its reputation. These circumstances, I have no doubt, helped to make my duties lighter, and my position much less difficult than I expected. For this, however, I believe I am also much indebted to the able assistance of our talented and indefatigable Secretary, Mr. Mackay, and the uniform and cordial support I have received from the members of council, for which I now offer them my warmest thanks.

On taking a retrospect of the year which is now about to close, I have much pleasure in noticing various grounds for satisfaction. The number of those who have passed the examination in Edinburgh this year is just double what it was last year, which, I think, affords the best evidence of the prosperity of the society, and of an increasing desire to share its benefits and support its objects. The contributions to our scientific meetings have been as numerous and as able as heretofore ; the subjects as important and the speakers as distinguished as on former occasions ; and nothing, I think, was wanting but a larger attendance, and a more extended interest in our proceedings. When the number of individuals connected with our business in this city is considered, it seems reasonable to desire some improvement in these respects, more especially on the part of the assistants and apprentices, for whose benefit, chiefly, these meetings are arranged and kept up. I think it ought to be regarded as a great privilege to have opportunities of attending such meetings, and hearing such valuable papers read, on subjects closely connected with our business. The time has been when no such opportunities were afforded us ; when, instead of having scientific instruction imparted to us in that easy and pleasant way, it had, in many cases, to be altogether dispensed with, or self-acquired amidst great difficulties and by a vast expenditure of labour.

Dr. Macadam, who has always taken a deep interest in the society, and from whom we have received many favours, opened the session with an able communication on pharmaceutical chemistry in its relation to the vitality of the bodily frame in health and sickness, in which he took occasion to notice and illustrate the various forces which influence vital activity, embracing heat, light, motion, electricity, magnetism, and chemical affinity,—a subject which he handled with his usual skill, and which was listened to with marked attention. After which Mr. Mackay made a few remarks on some specimens of Radix Scammoniæ, from Killis, in Asia Minor, presented by Mr. Ransom, of Hitchin ; and also on Howell's new capsule for poison bottles, which, after some discussion, was, with the whole subject of poisoning, remitted to a committee to consider and report. At our second meeting, Professor Archer gave us some interesting notes on a few curiosities of Brazilian pharmacy, various specimens of which were exhibited to the meeting, and also several varieties of dried flowers, used for scenting teas, from Canton. In the course of the conversation which followed, several questions were put to Professor Archer, regarding the sources and uses of the preparations from Brazil, which he, as usual, answered readily and satisfactorily. At the next meeting, Dr. Scoresby-Jackson delivered a masterly address on the present position of Pharmacy in Great Britain, and on the teaching of Pharmacy in Edinburgh, in which he showed "that, as a science, Pharmacy has rapidly advanced, and is now attaining a high and honourable rank in the cycle of medical science ; that, as an art, it is remarkable for the elegance and utility of its productions as compared with those of the earlier part of the present century ; and that, with respect to those engaged in the study and practice of Pharmacy, there is in the Pharmaceutical Society a combination of power capable of realizing the ultimate desires of the most ardent lovers of their profession." He also showed that, while the status of the Pharmaceutical Chemist had been much improved, it was necessary to have a higher Pharmaceutical education than at present, and pointed out the means by which it was most likely to be attained. As might have been expected from the ability of the speaker and the importance and reasonableness of the subject, it was warmly received and applauded, and led to an interesting discussion, in the course of which several members and visitors intimated their concurrence in the views which had been expressed. Our fourth meeting proved to be as interesting as the others. Professor Archer again favoured us with some notes on a new species of galls from China, a substance from the Cape of Good Hope, resembling saffron in its properties, and a new product called African cubebs ; excellent specimens of each of which were handed round for inspection. On the same occasion, our Vice-President, Mr. D. R. Brown, convener of the committee appointed to consider the best means of preventing poisoning, read the report of the committee on the subject, which, after a long and animated discussion, was unanimously adopted. While it is hardly to be expected that there will be no difference of opinion on a subject of so much importance as that referred to in this report, I feel persuaded that the more it is considered in a practical light, the more clearly will it appear that its conclusions are sound ; that in contending for intelligence, care, and accuracy on the part of the Pharmaceutist, it takes the safest and most intelligible ground ; and that, in declining to recommend for general adoption any of the mechanical monitors, or so-called safeguards, which have been recently suggested, it avoids what there is reason to fear would soon increase instead of lessening the danger. At the last meeting, our Vice-President made some remarks on specific gravity, which he illustrated by a variety of interesting experiments. Mr. P. Stevenson also kindly exhibited and explained various instruments for taking specific gravities, and accompanied his observations with a number of simple and beautiful experiments, which were successfully performed. The present is our sixth meeting; and I am sure that after the very able remarks to which we have just had the pleasure of listening on the subject of chloroform and the tests for its purity, in the British Pharmacopœia, and the instructive experiments which we have just witnessed, you will admit that the session has been brought to a very successful termination. The subject which Mr. Brown has brought under our notice is one not only possessing some novelty, but is of considerable importance both to the scientific chemist, and the manufacturer and vendor of chloroform, and will no doubt receive from them the attention which it deserves.

On the whole, then, I think I am warranted in saying that during the session we have had an abundant supply of excellent subjects provided for us; that we are under great obligations to all the gentlemen who so kindly laboured for cur instruction; and that they are well entitled to our sincere and hearty thanks, which I now, with much pleasure, offer them in name of the Society.

As might have been expected, the Pharmacy Bill has been attracting a large amount of attention, and forming the subject of much discussion in all parts of the country; but it is gratifying to find that there is a very general expression of opinion in its favour, and that from this city a petition was presented to Parliament, containing 105 signatures, or nearly all the chemists and druggists and their assistants in the town. It is, however, interesting to notice that when non-professional parties object to the Pharmaceutical Society's Bill, it is generally on the ground that it contains no poison schedule—thus showing that they regard the classification of poisons as not only necessary for the general safety, but easy of attainment; while to the professional mind it is surrounded with difficulty, and appears a subject sufficiently large and important to require separate legislation. That it is so is very evident from the complete failure of the attempt which has been made to construct a poison schedule, in connection with the Chemists and Druggists Bill, No. 2, which includes among dangerous drugs articles which are comparatively harmless and others which are quite innocent, and omits altogether such articles as hydrocyanic acid, the preparations of silver and copper, and the mineral acids, etc.,—and is, therefore, not only useless for its purpose, but in the highest degree crude and impracticable. I am satisfied that the Bill which has been introduced by Sir Fitzroy Kelly contains all that is necessary in present circumstances. Its object is evidently a good one, and really for the benefit of the whole trade.

I cannot conclude these remarks without saying what I am sure we all feel, that we have been very much gratified by receiving from Mr. Hills, of London, the beautiful bust of Jacob Bell which now adorns this hall, and that we will carefully preserve it, not only as a representation of the great original, but as a memorial of his generous and persevering efforts for the elevation of Pharmacy, and of his noble and disinterested services as the founder of the Pharmaceutical Society.

I have now only to thank you all very cordially for the unvarying kindness I have received during my year of office, and to assure that, even in a humbler position, it will give me pleasure to promote the interests of the Society by every means in my power.

Mr. Mackay proposed a hearty vote of thanks to the Chairman for his services to the Society during the past year, which was agreed to most cordially and with acclamation.

Arrangements in connection with the library for the summer months were then intimated, and the meeting separated.

The Annual Meeting of the Society took place in the Café Royal on Tuesday evening, 18th April, at eight o'clock; Mr. Kemp, President, in the chair.

The Secretary read the following

ANNUAL REPORT.

The Council have, as usual, to lay before the Society their Report for the past year; and in doing so, cannot refrain from expressing their belief, that never, perhaps, in the history of the Society, was there a more important period than the present.

It is scarcely necessary to refer to the onward progress of the Society since its foundation, now nearly twenty-four years ago; nor need allusion be made to the passing of the Pharmacy Act, under the operation of which, the Society has now for so many years carried on its examinations and other departments of its machinery. A growing desire has, however, for some time been felt, that some energetic action should be taken, by which, the provisions of the Act of 1852 might be improved and extended. Most now present know, that, under the auspices of the London Council, draft of a Bill was prepared and published, with the principal clauses of which all are acquainted. This Bill has passed into the hands of Sir Fitzroy Kelly, and has been by him introduced to the House of Commons. Having passed a first reading, it was brought up for the second, and was thereupon sent, along with another antagonistic Bill, having the same designation, to a select committee of the House. Unfortunately, the proposal to send to committee took place so short a time before Easter, that nothing will be done until the House again meets after the holidays.

The Council refrain from one word of comment on the rival Bill, feeling satisfied, that when the merits of the two Bills come to be inquired into and investigated, the interests of the public, as well as of the profession generally, will induce the committee to report very favourably to the House on behalf of Bill No. 1. Influential deputations have waited upon the Lord Advocate and Adam Black, Esq., in connection with Sir F. Kelly's Bill, and the same was brought under the consideration of the Convention of Royal Burghs by one of our members, and received favourable consideration.

It is matter of rejoicing and satisfaction to know, that amidst all the turmoil from without, the position and standing of our Society was never more secure, nor its prospects brighter than they are at the present moment. More inquiries have been made regarding the terms of admittance during the past, than during any previous year. The examinations have also been more frequent, and several members have been admitted.

The Museum and Library are in a prosperous state, and new catalogues of the books have been printed, and are ere this in the hands of all connected with the Society. Several additions of new and interesting volumes have been lately made; and the Council will be glad to find an increasing interest in the perusal of books belonging to the library.

The scientific meetings have been six in number, and the Council feel glad that they can fairly state, that these have been, on the whole, well attended.

The Council feel that the very special thanks of the members in Scotland are due to the London Council, for the time and labour which have been bestowed by them upon the affairs of the Society, and they sincerely hope a full measure of success, may attend the introduction of the proposed extended Pharmacy Act, now in the hands of a select committee, having been introduced to the House of Commons by Sir Fitzroy Kelly. It may be gratifying to our London brethren to know that chemists and druggists, as well as the medical and general public here, highly approve of the proposed Bill, and many a hope has been expressed by all parties, that the Bill now pending, may pass the House, before dissolution takes place, and thus without delay become the law of the land.

The following is an abstract of the Secretary's account for 1864:—

Dr. *Annual Account.* *Cr.*

1864.		£.	s.	d.	1864.	£.	s.	d.
June 4.	Cash sent from London	50	0	0	Books, etc., for Library	10	15	0
Dec. 31.	Do. due Secretary	16	18	6	Expenses of Meetings	1	13	7
					Postages	1	10	16
					Insurance	0	7	1
					Rent	30	0	0
					Annual Meeting	3	5	0
					Jars, etc., for Museum	5	19	3
					Printing	5	15	0
					Curator	5	0	0
					Advertising	1	10	9
					Envelopes and Incidental Expenses, etc.	1	1	6
		£66	18	6		£66	18	6

We, the undersigned, have examined the foregoing accounts, with vouchers attached, find them correctly stated and entered, and the balance due to the Secretary, as at 31st December, 1864, sixteen pounds eighteen shillings and sixpence sterling.

(Signed) D. R. Brown.
James Gardner.
William Ainslie.

On the motion of Mr. Seath, Dunfermline, seconded by Mr. Borland, Kilmarnock, the Report was unanimously adopted.

The meeting thereafter proceeded to elect the following office-bearers for the ensuing year:—President, Mr. Kemp, Portobello. Vice-President—Mr. D. R. Brown. Secretary—Mr. Mackay. Council—President and Vice-President, G. Blanshard, Smith (Kilmarnock), Flockhart, Aitken, Borland, Govan, Noble, Gardner, Raimes, Ainslie, Stephenson, Young, Tait, Croley, Buchanan, and Allan.

Examiners—President and Vice-President, Messrs. Gardner, Aitken, Ainslie, Tait, Young, Noble, President and Vice-President of the Society in London, and Secretary in Edinburgh, *ex officiis*.

Curator—Mr. W. Hill.

Library and Museum Committee—President and Vice-President, and Messrs. Ainslie Young, and Noble.

THE ANNUAL SUPPER.

The annual supper of the Society took place in the Café Royal at the close of the above meeting. About 100 gentlemen were present. Mr. Kemp, President, occupied the chair; and Messrs. D. R. Brown and Mr. Raimes were croupiers. Among those present were Professor Archer, Dr. Stevenson Macadam, Bailie Alexander, Dr. Scoresby-Jackson; Dr. Robertson, Glasgow; Mr. Moffatt, Glasgow; Mr. Campbell, Glasgow; Mr. R. Stevenson, Mr. Seath, Mr. Gardner, Mr. Young, Mr. G. Blanshard, Mr. M'Donald, Mr. Borland, Mr. Mackay, Mr. Ainslie, Mr. Buchanan, Mr. J. B. Stevenson, Mr. B. Allan, Mr. Noble, etc. Letters of apology were read from Professor Christison, Professor Douglas Maclagan, Mr. Aitken, Mr. Hart, Glasgow; and other gentlemen.

After a first-class supper had been served by Mr. Grieve,

The Chairman, in neat and appropriate terms, gave the usual loyal and patriotic toasts, which were cordially responded to by the company.

The Chairman, in proposing the toast of the evening, "The Pharmaceutical Society," said the Society had done much to bring chemists and druggists together, to make them known to each other, show them that they had a common interest, and that they should have a common object and bond of union. The aim of the association had ever been the advancement and elevation of pharmacy, and the improvement of the condition of those who were engaged in it as a profession. He was sure they all wished continued success and prosperity to the Pharmaceutical Society. (Applause.) He remarked that the Society would not have been true to itself, true to its history, true to the well-known objects which its great and illustrious founder designed it to accomplish, if it had not brought in such a Bill as that which was now before Parliament. (Applause.) One of the results of that Bill, if passed, would be to see that chemists and druggists were properly qualified for their professions before they were admitted to it,—a result that could not fail to do good. (Applause.)

The following toasts were given and responded to:—"The Lord Provost, Magistrates, and Town Council of Edinburgh," by the Chairman, and replied to by Bailie Alexander; Song; "The Royal College of Physicians and Surgeons," by the Croupier, replied to by Dr. S. Jackson; "President and Council, London," by Professor Archer, replied to by Mr. Mackay; Song; "Our Friends from Glasgow, and Visitors from a distance," by Mr. Ainslie, replied to by Dr. Robertson, of Glasgow; "The Memory of Jacob Bell," by Mr. Young; Song; "The Honorary Members of the Society," by Mr. Moffat, replied to by Dr. Macadam; "The Chairman," by Mr. Blanshard, replied to by the Chairman; Song; "The Croupier," by Mr. Raimes, replied to by the Croupier; "The Secretary," by Dr. S. Macadam.

PROVINCIAL TRANSACTIONS.

LEEDS CHEMISTS' ASSOCIATION.

The Sixth Meeting of the Session was held on the evening of March 8th, when Mr. J. Abbott and Mr. G. D. Scorah favoured the company by an interesting exhibition of microscopic objects, projected on to a screen by means of the oxy-hydrogen light.

The Seventh Meeting of the Session was held in the Philosophical Hall on Wednesday evening, the 5th April; Mr. Haigh, the President, being in the chair. The attendance was very good.

After the reading of the minutes, and the election of Mr. Holmes as a Member, and Messrs. Thos. Garside and Wm. Arkle as Associates, a lecture was delivered by W. E. HEATHFIELD, Esq., F.R.G.S., of London, on Water.

The lecturer began by observing that every one ought to make himself thoroughly acquainted with everything connected with his own vocation. In accordance with that sentiment, he had ventured to put together a few observations relative to one of the most useful bodies within our reach—namely, water.

Mr. Heathfield then proceeded to give the properties of water in detail, pointing out its existence in the states of vapour, liquid and solid; its general diffusion over the globe; its composition, as shown by Cavendish in 1781; the heat produced by the combination of its elements being adequate to raise 34,000 lb. of water 1° F., or to lift mechanically 47,000,000 of pounds weight one foot high; its necessity for sustaining our lives; its usefulness in the form of oceans, rivers, clouds, and glaciers; its property of refracting light; the degree in which it conducts heat and electricity; its chemical relations; its compressibility, and capacity for heat.

The lecturer showed that *in vacuo* water boils at 100°, and, therefore, extracts boiled *in vacuo* contained a greater amount of the aromatic part of vegetables than when a greater degree of heat was employed. Water, freed from air, could be raised 100° above its ordinary boiling-point without passing into vapour, but the violence with which ebullition suddenly took place in such cases was enormous. The explosion of locomotives might perhaps sometimes be explained in this manner.

The solvent power of water was then alluded to, and its proportion in animal tissue, bile, blood, etc., stated. The purest natural water was generally obtained from lakes—Loch Katrine, for instance, containing but two grains of solid matter to the gallon; the lecturer afterwards explaining that this arose from the water having to pass through strata which had the power of depriving it of some of its saline, as well as its mechanical impurities. Mineral waters, and the Dead and Caspian Seas were then described, and the fact stated that water contracts until it reaches the degree of 39° F., at which point it begins to expand, and the very important consequences of this fact were alluded to. Dr. Wells's 'Essay on Dew' was noticed, and some of his experiments detailed.

After the lecture, questions were asked by Messrs. Atkinson, Brown, and Harvey, on the methods of obtaining pure water, its compressibility, and the effect of freezing in depriving it of salts; all of which were replied to by Mr. Heathfield in a satisfactory manner.

A vote of thanks was cordially and unanimously passed, on the motion of Mr. Ward, seconded by Mr. B. Taylor.

This was the concluding meeting of the present Session.

MEETING OF PHARMACEUTISTS AT LEEDS.

A meeting of the Pharmaceutical Chemists of Leeds was held at the Philosophical Hall on March 27th, 1865; Mr. HARVEY in the chair.

It was resolved:—

1st. That it is desirable that further legislation should take place to institute compulsory examinations for persons who may hereafter commence business as chemists and druggists. That the Pharmaceutical Society is capable of serving as a basis for such an enlarged institution, and what it has already accomplished would justify its receiving such a trust. At the same time, the fact that there are a considerable number of chemists and druggists well qualified to become members of the Pharmaceutical Society, renders it both just and politic to act liberally towards such persons.

Proposed by Mr. Williamson, seconded by Mr. Smeeton. Carried unanimously.

2nd. That the petition in favour of Sir Fitzroy Kelly's Bill be adopted.

Proposed by Mr. Haigh, seconded by Mr. Reinhardt. Carried.

(Signed) R. REYNOLDS, *Local Sec.*

Upon the 27th and 28th, the petition received the signatures of thirteen Pharmaceutical Chemists and of fourteen assistants, and was forwarded to Mr. Baines.

NOTE.—The 'Chemist and Druggist,' for April 15, gives a report of this meeting as follows:—

"A meeting of the pharmaceutical chemists of Leeds was held at Messrs. Harvey and

Reynolds', 13, Briggate, March 27th, 1865. *Eight* out of *thirteen* were present. It was resolved to petition the House of Commons in favour of the Pharmacy Act, 1865. The petition was signed by seven pharmaceutical chemists and their assistants, and presented by Mr. Baines."

I am sure that the gentleman who edits the 'Chemist and Druggist' would not intentionally propagate such false news, and I trust that he will feel bound to publish the name of the person who furnished him with this bundle of misstatements.

The pharmaceutists of Leeds have consistently advocated the adoption of a liberal policy towards non-members, as indicated by their resolutions respecting the Pharmacy Bill in May, 1864, and renewed at the present meeting. They have done this while many of their brethren in other towns have asserted that animosity against the Pharmaceutical Society was the leading idea with the supporters of the United Society. But they saw in Sir John Shelley's Bill a proof that it is much easier to find fault than to act better than those whom we blame. As soon as the United Society commenced its *constructive* efforts, its members perpetrated a blunder transcending all the faults of the older society, for they let slip the labours of a quarter of a century in trying to supersede the Pharmaceutical Society, and also staked all upon their claim for privileges, which it was clear the Legislature could not grant, even were vested interests the only obstacle. Such a policy is revolution, and not reform. The pharmaceutists of Leeds saw this, and represented it in the proper quarters, supporting Sir F. Kelly's Bill, as being capable of all modifications that could be reasonably demanded.

I would ask whether the organ of the United Society will take the responsibility of the perversion of facts now exposed, or will it let us know the origin of such mischievous news?

R. R.

ORIGINAL AND EXTRACTED ARTICLES.

MICROSCOPICAL RESEARCHES ON THE ALKALOIDS, AS EXISTING IN CHINCHONA BARK.

BY J. E. HOWARD, F.L.S., ETC.

In the valuable and very interesting paper "On microscopical research in relation to Pharmacy," by Messrs. Deane and Brady, read at the last Pharmaceutical Conference, your readers will have been enabled to see how much assistance may be thus rendered in the discrimination of vegetable products, especially of the varieties of opium. Reference is made in the same paper to the existence, as visible under the microscope, of the Chinchona alkaloids, *in situ*, in the bark. I am far from supposing that any such practical application can be made of this discovery, which I announced in my 'Nueva Quinologia' in the year 1861, for the following reason:—the combinations of the alkaloids with kinic acid are extremely soluble, so that in any bark in which these are the prevalent constituents, it is very difficult to ascertain any crystalline appearance. But this is not the case in all chinchona barks, as for instance in the commercial red bark, the *Ch. succirubra*, in which the prevalent combination appears to be of a different kind. It is in reference to a very fine specimen of this red bark that I published the following observations:—

"In order to gain as much information as possible from the rich bark under consideration, I made sections of a portion for microscopic investigation, and was rewarded by some appearances which I had not before seen. The eye was at once arrested by very numerous stellate groups of crystals, diffused irregularly throughout the substance of the bark. I thought at first that they must be *raphides;* but further investigation led me to see that they are entirely soluble in spirit of wine, and even in ether, that they polarize the ray of light, and thus much more resemble combinations of the alkaloids than those bodies which are called raphides, and which are understood to be composed of salts of lime and magnesia, insoluble in the media above named.

"The crystals are arranged in the substance of the bark indeterminately, and without any reference to the organic structure of the bark. They are not formed in the cells, but cross these in every direction,—radiating generally from some small nucleus, and presenting very much the appearance of some compounds of the alkaloids in their crystalline form. They evidently are not the product of vital processes taking place in the plant in its living state, but must result from changes in the juices of the bark after its removal from the tree;* indeed, it can be no surprise if a sap-fluid containing eleven or twelve parts of salts of the alkaloids in a hundred should then at least (if not even whilst maturing on the tree) betake itself to crystallization.

"In order to observe these perfectly, I found it necessary that the section of bark should not be too thin, as otherwise the action of the caustic would be too powerful, leaving only the ultimate structure of the cellular tissue. I compared the crystals with those of Cinchonine, Quinidine, and Cinchonidine; but the character of the decoction of the bark being always acid, seemed to forbid the expectation, which indeed was not realized, of finding the crystals coincide with these. At length it occurred to me to compare the crystallized compound of quinine, formed, as I have mentioned, under the head *Ch. succirubra*, by adding quinine to the ethereal solution of the mother-substance from the heartwood of the tree. I found the crystals, which under some circumstances this compound forms, to agree exceedingly well with those seen in the bark. The feeble amount of polarization in the two was a point of coincidence that could not be passed over; and on the whole, it is almost certain that the quinine is in this state of combination in Red Bark, since the decoction abandons, by cooling, a deposit in which I have ascertained the presence of quinine, chinchona-red, and kinovic acid, and after this has been deposited, no trace appears to exist of kinate of quinine, the only other probable form.

"I therefore conclude that the crystals seen in the bark-section are *Kinovate of Quinine* rather than kinova-tannate or cincho-tannate, since the cincho-tannic acid oxidizes off into chinchona-red, and leaves the quinine in combination with kinovic acid, as an almost colourless salt, such as is seen in the section" (as published in the 'Quinologia'). It is, however, not improbable that the cincho-tannic acid, during its oxidation, facilitates the combination, and as the kinovic acid in the different parts of the plant holds the exactly inverse proportion to the amount of alkaloid contained, it is difficult to avoid the presumption that the elements of kinovic or kinova-tannic acid in conjunction with ammonia, which is always present, may give rise to the alkaloids in the bark.†

The mother-substance I have referred to is described in the above work, under the head *Ch. succirubra*. It is extracted unchanged from the heartwood of the tree, by the simple action of ether, and appears like a resin when dried, having the composition $C_{46}\ H_{36}\ O_{10}$.‡ In this state it is not deliquescent, differing in this from cincho-tannic acid, and it is permanent. It may be heated in a sealed tube for twenty-four hours with chloride of ammonium without being decomposed; but, by the addition of a few drops of liquid ammonia, the bright yellow ethereal solution changes to a beautiful pink colour. By boiling with lime and water, it is broken up into kinovic acid (which passes through the filter in combination, separating with acids), and into very pure cinchona-red, which remains behind with the rest of the lime on the filter. This last is evidently the product of the oxidation of the cincho-tannic acid. The mother-substance appears to undergo some change in the roots. It becomes less soluble

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*"Seven pounds of green give four pounds of dry bark in this species (*Ch. succirubra*), (Spruce, Report, etc., p. 28,) whilst the freshly-peeled bark of the *Ch. lancifolia* dries to one-third of its weight (Karsten, Medicinische Chinarinden, etc., p. 17), so much greater, in its growing state, is the density of the fluid constituents in the former kind of bark than in the latter."

† See, as above, under head *C. magnifolia*.

‡ See my 'Quinologia,' under head *Ch. succirubra*.

in ether, contains less kinovic acid, and the substance, separating with lime, is no longer pure chinchona-red.

Now it is possible, both by *synthesis* and *analysis*, to obtain presumptive evidence that the crystals seen in Red Bark are in the above state of composition. By *synthesis*, because by the addition of an ethereal solution of quinine to that of the mother-substance, a red-coloured compound ensues, which is capable, though with difficulty, of being crystallized from water, with separation of the chinchona-red, and also from spirituous media. By *analysis*, since the same bark, treated in exactly the same manner with Liq. Potass. and then boiled with spirit of wine, yields Quinine, Cinchonidine, and Cinchonine.

We have next to consider whether one, or more than one, of the alkaloids are perceptible, and to assist in answering this question, I must beg your readers to compare my plates with those in Mr. Stoddart's paper "On the Purity of Sulphate of Quinine of Commerce."* I think that the correspondent forms will at once suggest the analogy which is probably the true one. The small tufted groups of crystals are quinine, (quinidine, when combined as above, has much the same appearance, but was not present,) and the larger and coarser crystals are in all probability cinchonine. It is not at all unlikely that cinchonidine may be indicated in some of the small aggregations of crystals. These crystals present a pleasing and varied appearance under the microscope, but I have not yet succeeded in making permanent preparations, since the glycerine which I generally employ gradually dissolves most of them, and I have not yet found any medium free from this objection. I had some specimens mounted in cells in pure water, intended for the museum of the Pharmaceutical Society, but found that the crystals slowly dissolved even in water.

Dr. Berg, of Berlin, in a recent publication, remarks, "The crystals which Howard figures, are not found in that manner in the bark, but are first formed through chemical treatment of the preparation." In this, as in most of his observations on barks, the professor seems to have drawn rather largely on the stores of his own insight. I am unable to conceive how it is possible that boiling a section of bark for two or three minutes in an exceeding weak caustic solution, washing with abundance of distilled water, and placing the slice immediately under the microscope, could by any possibility produce crystals intersecting the cells in all directions,† neither can I understand why it should invariably do this in one species of bark and in many others not at all.

The fact is that Dr. Berg's mode of preparation empties the cells of *all their contents*, and he cannot believe that any one has seen what he has not himself observed.

It is necessary for me to remark that Tuffen West, F.L.S., our most skilful microscopical draughtsman, was employed in the first instance, and since then two others, to delineate the crystals, so that it is no peculiarity either in the vision or the microscope of one person that can be productive of inaccuracy in the observation.

I will now proceed to a more particular description of the microscopical drawings, which were made by my son John Eliot Howard, jun., with the best powers of Powell and Lealand's make, and the binocular arrangement, which affords much clearer defining power in these cases.

Plate I.—No. 1 is a horizontal section of a portion of a quill of *Chinchona succirubra*, from the collection of Pavon. The drawing No. 1 was made as the object appeared under the half-inch; in No. 2, under P. and L.'s quarter-inch lens. In No. 1 will be seen, as at *a*, the rather compressed cells of the paren-

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* November, 1864.

† The bark must previously be macerated in water for twenty-four hours. From the time the slice is cut to its being placed under the microscope, less than five minutes should elapse, of which two minutes are passed in the boiling solution.

chyma of the liber mingled at *b*, with the liber fibres, of which the sections appear. These are bony spiculæ, traversed longitudinally by spiral canals, from which central point (the *lumen* of the Germans), when seen as cut transversely, radiate lines of communication, intersecting the layers of differing specific gravity which constitute these fibres. These penetrate the skin so that every one who handles the finest sorts of bark becomes experimentally acquainted with them; at *c* and *d* are the bundles of crystals of kinovate of quinine and cinchonine, as they are seen traversing the parenchyma in all directions, sometimes the ops only of the crystals appearing, whilst by *focusing*, these can be followed throughout their whole extent. In many cases the whole substance of the bark is penetrated by myriads of crystals. At *g*, to the right, is seen a crystal cell containing (*in itself*) the small crystals which distinguish this formation, which has nothing to do with the alkaloids of the bark, not being soluble as they are. These cell-crystals are the *Cristalzellen* or *Steinzellen* of the Germans. The crystals are understood to be oxalate of lime. These small crystals contained in special cells (and that chiefly in the poorer barks) contrast strikingly with the large and conspicuous crystals of the alkaloids.

Plate II.—No. 1 is a section of bark of eighteen months' growth, from Ootacamund, in the East Indies. The letter *a* refers to the cell structure of the parenchyma, seen here in its younger and more recently-developed state, traversed by bands of darker-coloured cells. At *b* is seen one of the few scattered liber-fibres, cut transversely. At *f*, the branching crystallization of one of the medicinal salts of the bark, *probably* kinova-tannate of quinidine. At *h* are globules of some alkaloid in salts which I have seen put on similar appearance. At *i* (Plate I., No. 1) are cubical or lozenge-shaped forms of alkaloids.

No. 2 shows at *a* (and throughout) the compressed parenchyma characteristic of mature red bark, at *b* the liber fibres, and at *e* (and throughout the plate) the contents of the cells appear to be gathered together in hard concrete rounded masses, presenting no regular crystalline aspect. These occur at times in the same barks with the crystals, and, I suspect, indicate the combination of alkaloid with an acid resin of which I have made mention in my 'Quinologia.'

Plate III.—No. 1 and No. 2 are sections of a very peculiar bark, mentioned by M. Planchon in his work 'Des Quinquinas,' p. 98, as sent by M. Rampon from New Granada, and containing 28 to 32 grammes of sulphate of quinine to the kilogramme. This would equal in richness specimens of *Ch. Calisaya.* My specimen was part of 272 *serons* from the Pitayo district, and gave per 1000 parts —quinine, 15·0; cinchonidine, 7·7; cinchonine, 0·34. I call it doubtfully *Ch. lancifolia?* The peculiar parenchyma at once strikes the eye at *a* in both drawings. The large coarsely-formed spiculæ of liber fibre at *b* are scattered almost in Calisaya fashion; and in this bark I again found, at *c* and *d*, groups of crystals (which indeed are interspersed through the whole bark). They appear to be of kinovate of cinchonidine, or of cinchonine, and quinine.

Plate IV.—No. 1 shows part of the section of a thick heavy quill of *Ch. succirubra*, exactly of the sort described by Delondre as *Quinquina rouge vif*, and corresponding to a piece of this in my possession. Professor Guibourt, when at my house in 1851, noticed this No. 1 as exactly resembling the sort of Red Bark analysed by Pelletier. It is remarkable for the distinctness of the false medullary rays which penetrate its substance, as at *h*, the portion shown being the inner part of the liber.

The bark contains cinchonine, 2·57; quinine, 1·71; cinchonidine, 1·43; or together, 5·71 of alkaloid. The crystals seen are probably those of quinine (*c*), cinchonidine (*d*). Those of cinchonine are seen in other parts both of this specimen and of No. 2.

No. 2 is a bark apparently of very different botanical origin, as indicated by the very distinct resin cells which mark this species, as at *j*, and which are entirely absent in genuine Red Bark. This No. 2 is a pale and spurious sort of

Red Bark, with a white epiderm, and is nearly, if not quite, the same with that described by Spruce as the Cuchicara sort of Red Bark. Its contents are, quinidine, 1·34; cinchonine, 1·00; or together, 2·34 per cent. of alkaloid.

Several questions remain to be solved, but the present brief notice will, I hope, justify the statement I have made of the existence of these crystals of alkaloid in the bark, and their being visible under the microscope by any person who will use the precautions indicated. A *microtom* for cutting sections of regulated thickness, though desirable, is not absolutely necessary; and furnished with a good razor and a tolerable microscope, any of your readers following closely the instructions in this paper, can pursue the investigation for themselves.

Reference to Plates.

a, Parenchyma.
b, Fibres of the Liber.
c, Kinovate of Quinine.
d, Kinovate of Cinchonine.
e, Aggregation of contents of cell.
f, Kinovate of Quinidine.
g, Crystal cells.
h, Globules (of alkaloid?).
i, Cubical or lozenge-shaped Crystals (of Alkaloid?).
j, Resin cells.
k, False medullary rays.
l, Kinovate of Cinchonidine.

PHARMACEUTICAL LEGISLATION.

HOUSE OF COMMONS.

Wednesday, March 29, 1865.

CHEMISTS AND DRUGGISTS BILL, No. 1.

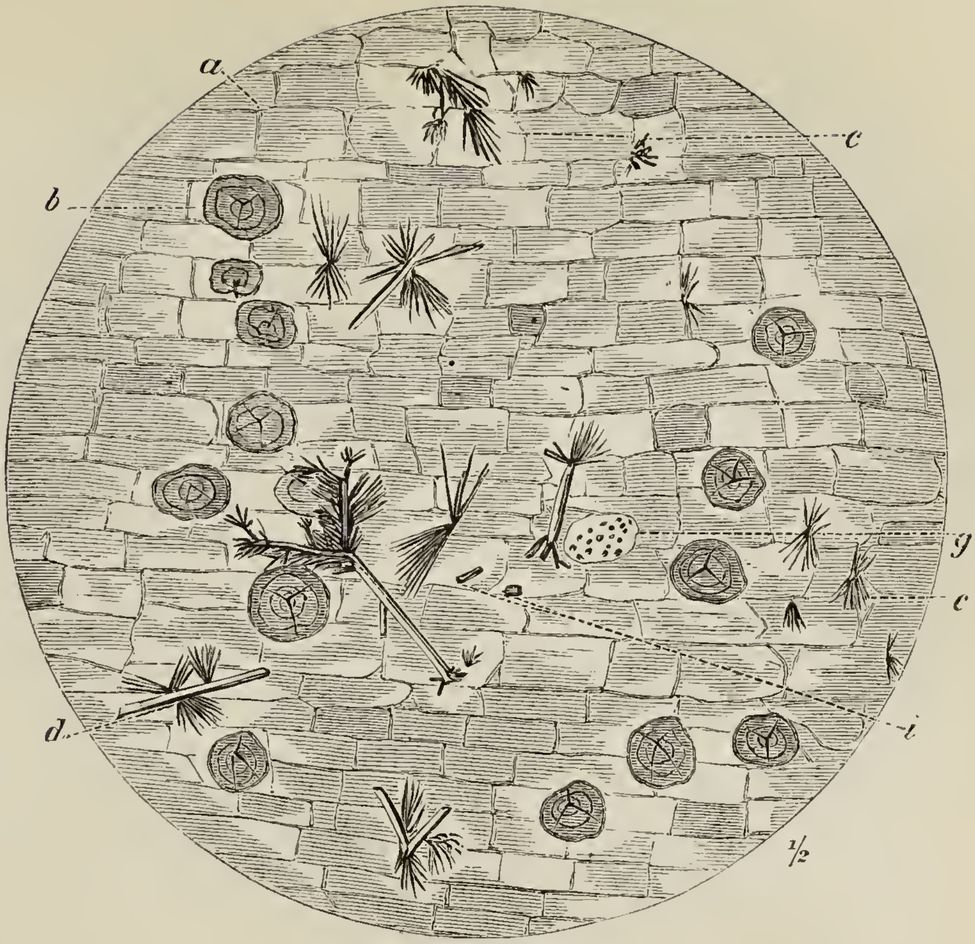
Numerous petitions were presented in favour of both Nos. 1 and 2 Bills.

On the order for the second reading of No. 1 Bill—

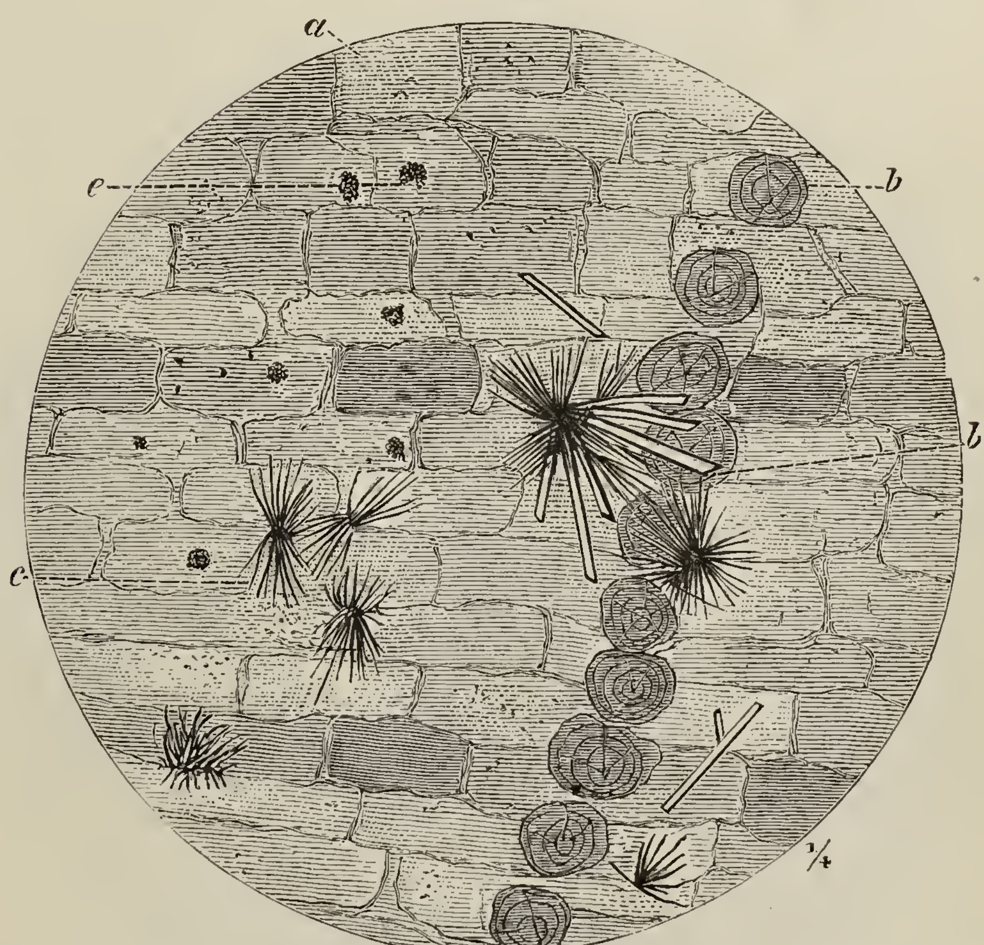
Sir FITZROY KELLY rose and said,—Sir, in moving the second reading of this Bill, I have to state to the House that it is designed for the regulation of the qualifications of Chemists and Druggists in Great Britain. This is a measure which has been long and urgently required for the protection of the public, and a measure which has been desired by all the more respectable and worthy members of the profession of Chemists and Druggists throughout the kingdom. I shall be able, I trust, in a very few words to explain to the House the object of this Bill, and also the means by which that object is sought to be carried into effect. Sir, it is well known to the House, and, I fear, it is too well known to most of us here, perhaps personally known to us, that as the law now stands, there is absolutely no protection whatsoever to the public in general against the mistakes of those persons who are permitted to carry on the trade or business of a Chemist and Druggist, and, consequently, of those persons who are allowed to make up medical or physicians' prescriptions, and which are made up by persons who, as is well known, are ignorant and incompetent for that duty. (Hear, hear.) Sir, I believe that the law ought to provide some protection against the evils and dangers to which the general body of the public are now exposed in this respect. I have been informed that the Medical Council have recently called the attention of her Majesty's Government to this most important subject, in the hope that the right honourable baronet, the Secretary for the Home Department, would himself introduce a Bill to provide a remedy against the many evils complained of, and I can say with all sincerity that I should have been very glad if the Government had accepted the suggestion of the Medical Council, and had introduced a Bill upon this subject; but as the Government have shown no disposition to act upon the suggestions made to them, the Pharmaceutical Society, which has been long established, and whose acts and proceedings have conferred a great benefit upon the public generally, have thought it to be their duty to submit this measure to the consideration of the House and the country. The Medical Council called the attention of the right honourable baronet to the defects and to the present state of the law, under which any person may dispense or make up medicines, and that Council expressed an opinion that some enactment is required to prevent persons from keeping open shop, for the purpose of such dispensing or making up of the prescriptions of physicians and

Plate I.

No. 1.



No. 2.

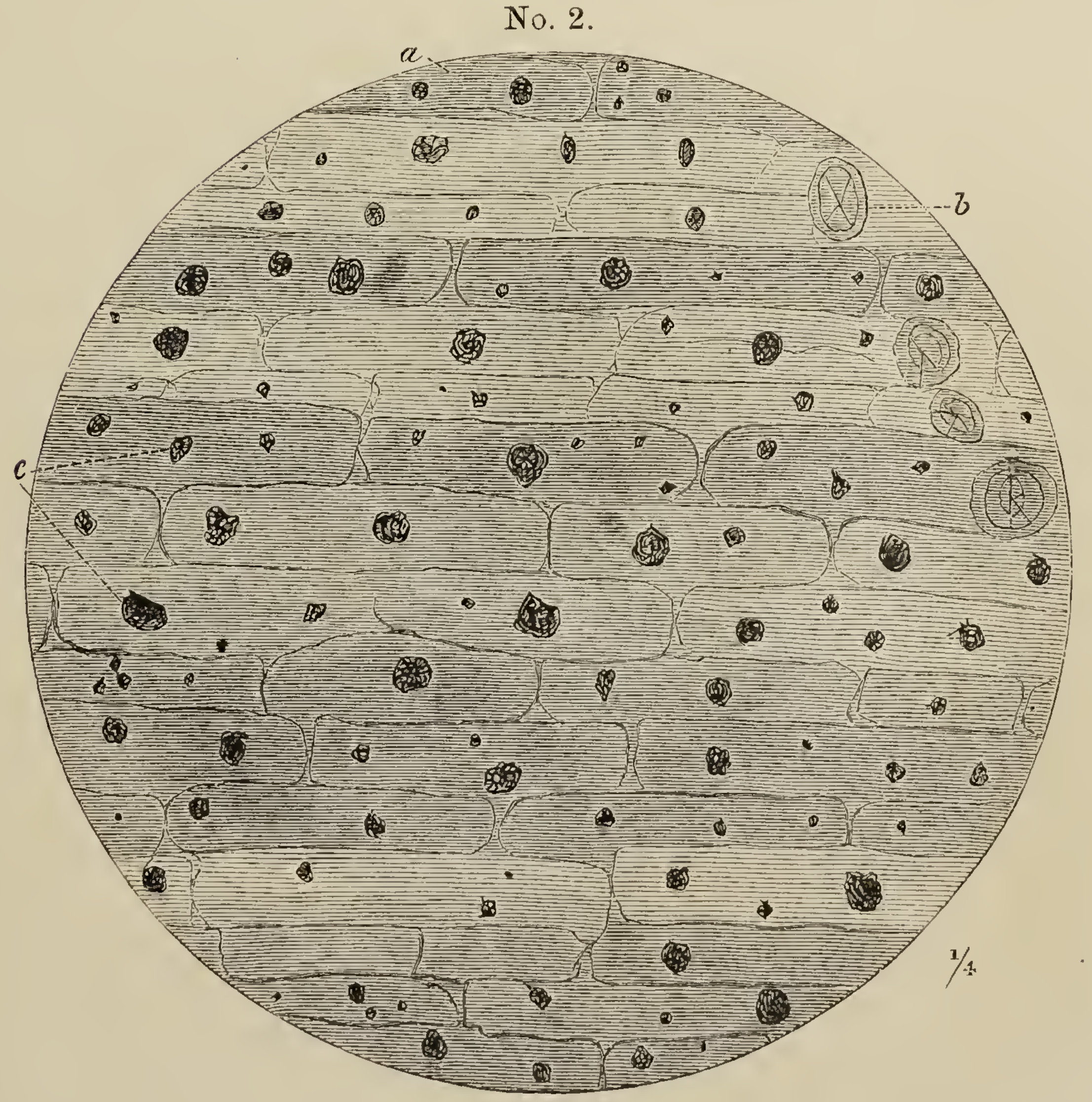


CHINCHONA SUCCIRUBRA, *Pavon.*

Plate II.

No. 1.

No. 2.

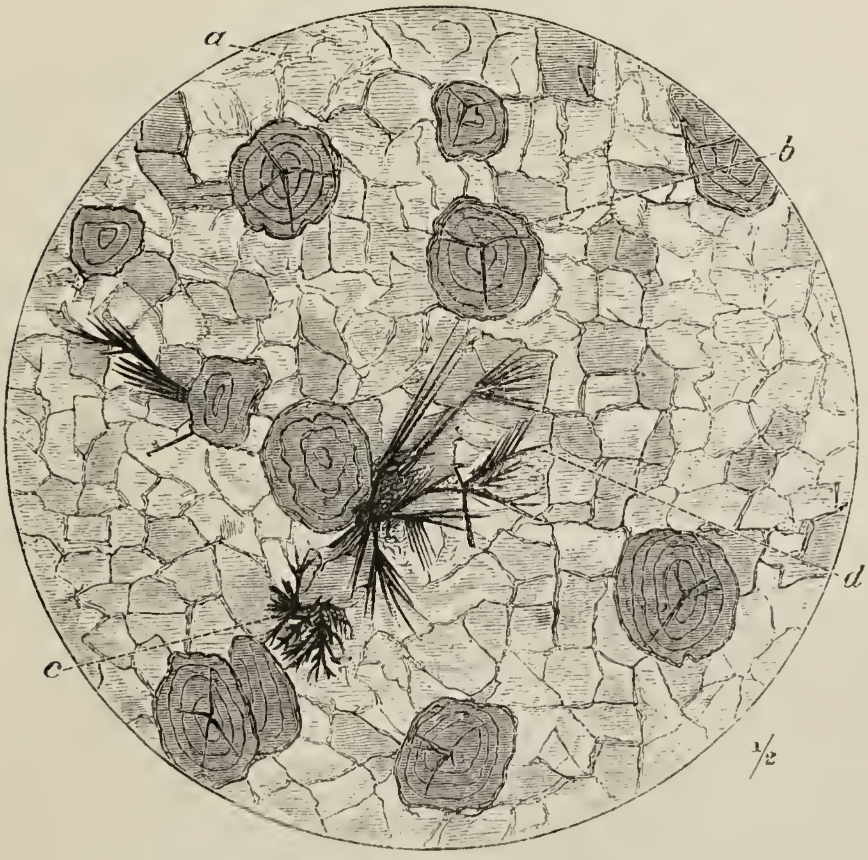


CHINCHONA SUCCIRUBRA.

Plate III.

No. 1.

No. 2.

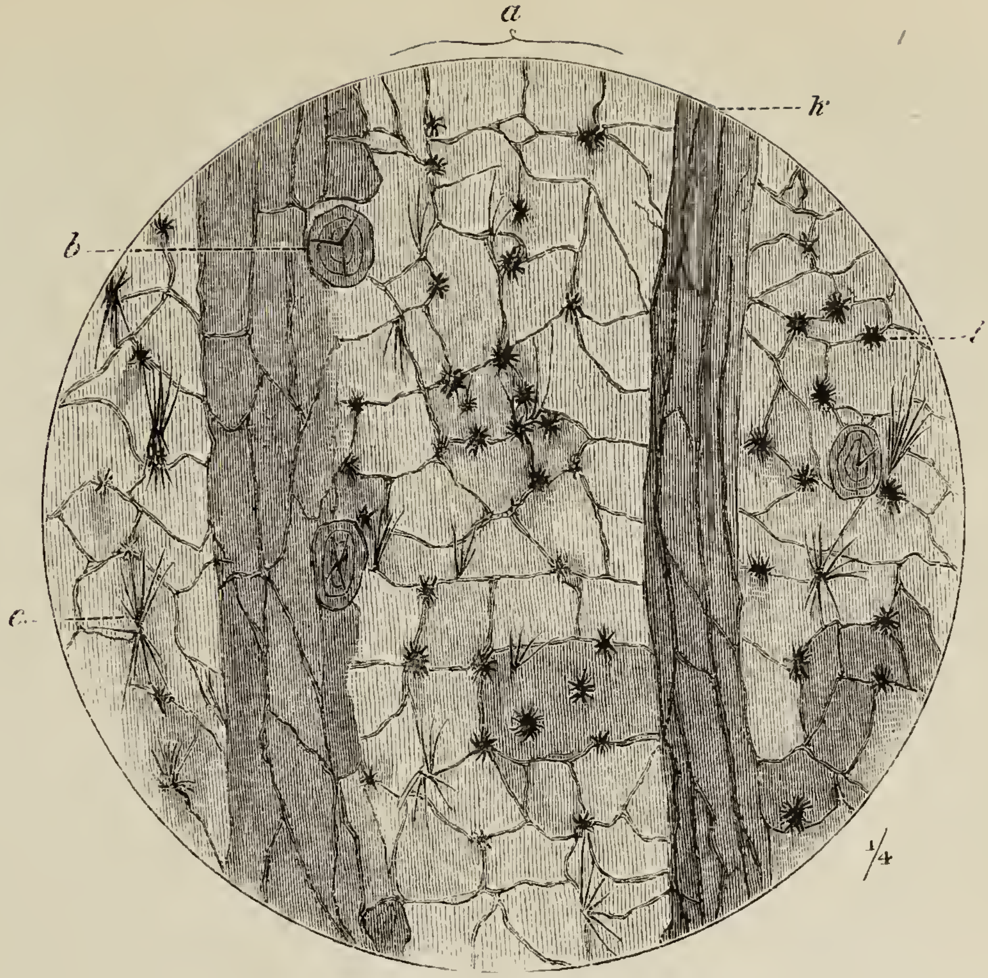


CHINCHONA LANCIFOLIA?, var.

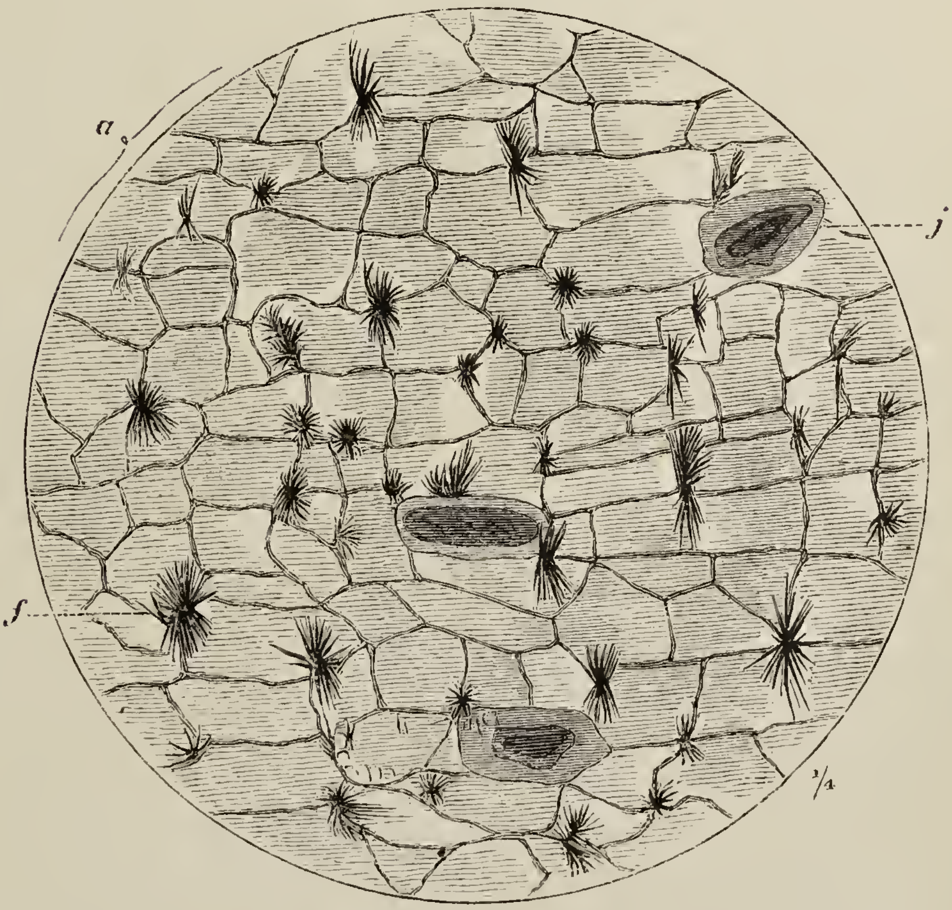
[Pharmaceutical Journal, May, 1865.]

Plate IV.

No. 1.



No. 2.



CHINCHONA SUCCIRUBRA, var.

others, without having previously undergone an examination. (Hear, hear.) I think many sound reasons exist why the Government should have undertaken the duty of bringing in a Bill. However, the right honourable gentleman has thought it right not to move in the matter, and consequently the society of Chemists and Druggists, which has been long established in Bloomsbury Square, and with whose proceedings, as I have already stated, the public are well acquainted, have done so; and, under the instructions of the Council of the Society, the Bill which I have now the honour of submitting to the House has been prepared. Sir, I may say that this Bill is neither more nor less than this—there being now no qualification whatsoever, that is to say no qualification making it necessary for any person who desires to follow the trade of a Chemist and Druggist to undergo an examination, or to take out a license, before he commences business, nothing in fact which, by force of any law, makes it necessary for a Chemist and Druggist, or any other person, no matter however incompetent or ignorant he may be, to be examined before he commences carrying on this business. (Hear, hear.) Sir, by this Bill it is proposed, and it is thought to be expedient for the safety of the public, that all persons who desire to carry on this business, in the keeping of open shop, shall possess a competent practical knowledge of such business, and that they shall, before commencing such business, be duly examined as to their skill and knowledge; and it is submitted that this is the only mode by which the public can be protected from the dangers to which they are liable. Therefore, with certain exceptions to which I will refer presently, it is proposed that all Chemists and Druggists shall submit themselves to an examination, and upon the result of that examination they will be allowed, or otherwise, to carry on the business. Sir, this course will, I think, be considered a very obvious remedy for the grievance which has been so long allowed to remain amongst us; the proposition in the Bill is, that all persons who shall hereafter carry on the business shall be subject to an examination, and, upon receiving a certificate of fitness, shall be registered in a register to be kept by the Pharmaceutical Society, and upon that registration they shall be allowed to carry on the business of a Chemist and Druggist, and to make up medical prescriptions. (Hear, hear.) The register will be kept, as I have mentioned, by the old-established Pharmaceutical Society. The only question which remains for consideration is, what is to be the nature of the examination, by whom shall it be conducted, and where shall it be carried out? Upon this point I may state to the House, with the most perfect confidence, that there already exist the means and the machinery—an entire system of machinery—upon which these examinations may take place with the most perfect security and greatest satisfaction to and of the public. They can take place within the building of the Pharmaceutical Society itself. (Hear, hear.) In consequence of the powers conferred by charter upon the Pharmaceutical Society, I may state that certain rules and regulations have been promulgated by the Society, the existence of which dates from the year 1843, when it was incorporated; and since 1852, other regulations have been made under what is called the Pharmacy Act, which was sanctioned by Parliament in that year. The benefits conferred upon the public by the Pharmaceutical Society have been founded upon a system of examination of all persons who desired to carry on business as Chemists and Druggists, and these examinations were instituted for the purpose of preventing persons appearing before the public without a certificate of fitness, granted under such circumstances as should satisfy the public that the person named in it was duly qualified to dispense medicines. (Hear, hear.) The subjects upon which these persons are examined are chemistry, botany, materia medica, and the Latin language, and the body of gentlemen appointed to act as examiners undertake to grant certificates to the successful candidates, and these certificates show that each holder of them is qualified to be and to act as a Member or Associate of the Society. (Hear, hear.) It is proposed by this Bill—the whole substance and effect of this Bill (hear) may be comprised in this single proposition—that all persons who shall hereafter be desirous of carrying on the business of a Chemist and Druggist and of preparing medical prescriptions shall not be permitted to do so without first submitting themselves to an examination by the Pharmaceutical Society, and that upon a certificate of fitness they will be allowed to commence business. I should state to the House that after the examination the candidates will have to pay a small sum to the Society for being registered, and I may also state that if this Bill shall be passed into law certain duties will arise under it in regard to the regulation of fees to be paid to the Society; but as to this there is a provision in the Bill that every arrangement made by the Society shall be subject to the approval of one of her Majesty's Principal Secretaries of State. (Hear, hear.) The only question for consideration is whether these examinations will afford that security to the public which they have a right to expect, or whether they may not be too severe, and thus exclude persons from carrying on the business of Chemists and Druggists who might safely and properly be allowed to carry on this trade. (Hear, hear.) Now, Sir, it is quite impossible for me to speak too confidently of the nature and character of these examinations. They have been in existence and in actual practice for more than twenty years, and have been recognized and confirmed by an Act of Parliament which was passed in the year 1852, in which Act these examinations were made the subject of certain provisions. That Act was called the Pharmacy Act, and it received the sanction of her Majesty's Government of that period, and has been upheld by successive Governments, who approved of and supported it, and I now appeal to her Majesty's Government to approve and support this Bill. (Hear, hear.) I may inform the House that since the passing of the Act of 1852 the Government, or rather that part of it which governs the army, have required every army dispenser to obtain a certificate from the Pharmaceutical Society. This shows that those to whom the management of the army has been entrusted have stamped their approval upon all the proceedings of the Society; they have forbidden any one from becoming an army dispenser, they have prevented any one from dispensing or making up medicine for the army, in all its branches, except upon a certificate of the examiners appointed by the Pharmaceutical Society. And now it is desired to carry out the provisions of the Act of 1852 to a greater extent, so that the public may be protected against the danger of persons making up prescriptions unless they have previously passed an examination under the auspices of the Society. (Hear, hear.) Therefore, the whole effect of this Bill is neither more nor less than this, first, to protect the public by enacting that no one shall be permitted, except those to whom I will hereafter allude, to become or practise as a Chemist and Druggist for the compounding of medicines, or for the making up of prescriptions, unless he shall have been registered by the Pharmaceutical Society; and in order to be registered he must submit to an examination, and to be examined by the Pharmaceutical Society; and upon their certificate he may cause himself to be registered. A very great number of persons—some thousands—now carry on the business of Chemists and Druggists, and it has been thought too strong a measure, at least for any one but her Majesty's Government, to propose to this House to lay any important restrictions on those who now carry on this business, and who may have done so for a great length of time. (Hear, hear.) While therefore, on the one hand, the provisions of the Bill are stringent and precise, to the effect of prohibiting any one hereafter from becoming a Chemist and Druggist to make up prescriptions without having undergone an examination by competent examiners, it is likewise provided, that every one who can obtain the certificate of any medical practitioners that he has actually and *bonâ fide* carried on the business of a Chemist and Druggist for making up of prescriptions before the month of January, when this Bill shall have become law and come into operation,—that he may on that certificate, and without further qualification, be entitled to be registered and to carry on business as heretofore. If the Bill be read a second time, and when it comes into committee, if it should be thought on the part of her Majesty's Government that any restrictions of a severer character, that any other conditions should be imposed on existing Chemists and Druggists, it will be easy to introduce a clause to that effect. It will then undergo the consideration of the committee, and it will then be for the House to consider and determine whether or not it shall become law. In the meantime, all that we ask—all that I ask the assent of the House at present to—is the second reading of this Bill, with a view of securing the public against the carrying on of this business by utterly incompetent, unskilful, and altogether ignorant persons; that no one hereafter shall be held to be eligible to carry on the trade without a certificate of examination, and consequent registration, to which that certificate will entitle him. Now I do not think that after having stated the length of time during which the Pharmaceutical Society has been in existence, the universal approbation in which it is held by the Chemists and Druggists of the country,—the class of persons who are to be dealt with by this Bill,—as well as by those who have come within the operations of that Society, but, above all, that department of her Majesty's Government whose attention has been called to the subject, and in the discharge of its important public duty has found it necessary to protect those whose interest and safety are committed to their charge,—I mean the entire army of Great Britain,—that if the examinations have been carried on with success, and the approval of all classes and bodies of men, by the Pharmaceutical Society, I think I need not say more to the House than that here are at once all the requirements of this Bill, which will satisfy the House, that while, on the one hand, no undue restrictions will be imposed on any branch of a trading community, protection will be afforded to the public by that examination to which many have been subjected, and with the effect of which I have spoken; and that should this Bill pass into a law in its present form, we shall have all the protection that can properly be afforded by an Act of Parliament. (Hear, hear.) I should have contented myself with the few observations I have made, and have sat down, but I feel bound, in courtesy, and in discharge of my duty to the House, to allude to the Bill on the same subject which the honourable baronet, the Member for Westminster, has before the House. That Bill has two objects in view—one identical in object with the Bill I have now submitted to the House, the other, a much more extensive object,—being nothing more nor less than to prescribe the form and conditions upon which the sale of poisons, and of drugs, and of what are called chemicals in general, shall hereafter be sold. With regard to the latter branch, if I might so call it, of the honourable baronet's Bill, I have no more to say than this, that I believe it is a matter far too difficult, and far too complicated, and interfering too much with the freedom of many branches of trade, to be made the subject of a Bill in this House, except by and under the authority of her Majesty's Government. (Hear, hear.) And whenever her Majesty's Government shall undertake that question, the experience I have acquired in preparing this measure I shall be happy to bring forward and apply to the consideration of any such Bill; but in the meantime, with all humility and confidence, I do protest, most emphatically, against any such measure emanating from any individuals or body of persons. (Hear, hear.) With regard to that part of the honourable baronet's Bill which might be considered identical with that which I propose now to read a second time, I have only to say this,—we are agreed that some protection should be offered to the public against the incompetence and ignorance of certain persons carrying on this trade, and we are agreed that some examination should be applied,—that all such persons should be subjected to some examination, the result of which is to determine whether they shall be permitted, with a view to the security of the public, to carry on the trade of Chemists and Druggists. The whole question, therefore, between the two Bills, and which can be determined without the slightest difficulty by the House, is whether, if you find a body of examiners, and a mode and course of examination now in being, recognized and sanctioned by law, which has been carried on with effect and success, with the entire approval of the trade and the public in general, as well as that of her Majesty's Government, or, at all events, an important department of the Government,—whether or not we shall at once sweep away, set aside, and disregard that which is ready at our hands, and adopt that which the honourable baronet proposes, which is nothing more or less than to create a new corporate body, by a sort of general council of the whole of the Chemists and Druggists of Great Britain. The Chemists and Druggists are to elect a council, I think, of some twenty-one members, but what their qualification for the office is to be we are not told. They are to appoint a certain number of examiners, of whose qualification we know nothing, and these examiners are to administer some sort of examination, as to which we are also left in ignorance; and upon their report, the Chemists and Druggists of the country are to be declared duly qualified. That is the difference then between these two Bills, and that, I contend, may be decided, with little discussion, by this House, the Pharmaceutical Society's examinations having met with the entire approval of the public,—unless the House should think that the system already established, and which has been carried on with universal approval and success for years, is to be set aside, and prefer something of a speculative character which may or may not ever come into existence, there being no compulsory powers in the Bill, —unless, as I have said, the House shall prefer that sort of conjectural speculation to the established successful practical system which we find ready to our hands, established by the Pharmaceutical Society. Now, Sir, that is the question to be decided; and I shall, I hope with confidence, ask the House to agree to the second reading of this Bill. (Hear, hear.) I must, however, say one word more. It has been suggested that this and the other Bill shall be referred to a select committee. (Hear, hear; No, no.) Now, if there was anything in these two Bills upon which the select committee could obtain information, or could afford information or counsel to the House,—if there were any matter of doubt which might be the subject of evidence before a select committee, and upon which the report of a select committee could enlighten or assist the House,—I should be the last to stand up, for a single moment, and object to it. But upon the statement which I have made,—and, I hope, I have not unfairly stated the general effect of the honourable baronet's Bill, and I am correct in stating mine,—I am at a loss to conceive, as both are agreed that some qualification is necessary, and that it should be on the certificate of examiners upon an examination,—as both are agreed upon that point, and as the only question is, whether we are to have this long-established, practical, and successful examination, or an untried, conjectural, and speculative examination proposed by the honourable baronet,—that being the case, I should say, that that question might as well be discussed here, as before a select committee or any other tribunal. Under these circumstances, Mr. Speaker, I have to move that this Bill be now read a second time.

Sir JOHN SHELLEY.—It may be convenient to the House if I now say a few words on the proposition made by the honourable and learned gentleman. And, in the first place, I beg to state distinctly, on the part of those I represent on this occasion, that they have not the slightest intention of infringing or interfering with the privileges of that chartered body who are the clients of the honourable and learned gentleman who has moved the second reading of this Bill. The question is really a public one, and simply whether one of the recommendations of Dr. Taylor, the Government Commissioner, to the Government, as to the sale of poisons, shall be carried out or not. Now the honourable and learned gentleman, the Member for Suffolk, has correctly pointed out the difference between his Bill and that which I propose presently to ask the House also to read a second time. The honourable and learned gentleman's Bill goes, however, no further than this, that it lays down a certain examination which every one shall go through, under the superintendence of the Pharmaceutical Society, before they shall be allowed to make up a prescription, but beyond that it does not go. Now, I beg respectfully to point out to the House that this does not touch the trade of a Chemist and Druggist, because everybody knows a large proportion of the trade do not carry on the lucrative trade of dispensers; and that, in fact, many of them do not see a prescription once a *month*, nor once a *week*, and the honourable and learned gentleman's Bill does not in any way affect that portion of the trade. These persons who carry on the trade of Chemists and Druggists must be divided into two classes, namely, those who wish to become scientific chemists, and those who carry on the business of a Chemist and Druggist with, in point of fact, very little education, and who require little or no qualification for the branch of the trade in which they have embarked. Now, if I may be allowed, or may venture to say so, the Bill of the honourable and learned gentleman will interfere with all Druggists throughout the country, and not with those only who carry on business strictly as Chemists and Druggists. The position of the Pharmaceutical Society is this:—The Society is stated to have been in existence for many years, and to have acted under the Pharmacy Act since 1852. It has no doubt done a vast deal of good, at least so I have been informed, but I am also informed that the most good which has been done has been in towns, and that the operations of the Society have not reached the agricultural and other large districts of the country, nor, in fact, reached the public at large. Now this fact I think the House ought to know, and also that the Pharmaceutical Society once numbered about 4000 members, and that it has dwindled down to about 2300, including foreign and colonial members. (Hear, hear.) Now the United Society of Chemists and Druggists, whose Bill I shall have the honour of proposing to the House for a second reading, is composed of over 3000 members. (Hear, hear.) It is clear, I consider, that the examination prescribed by the Pharmaceutical Society will be too expensive for many Chemists and Druggists to go into, and no doubt this accounts for the falling off in the number of its members, and the superior numerical strength of the United Society of Chemists and Druggists. Now, in looking at the petitions which have been presented, it appears to me that the two Societies are squabbling over these matters; but the House ought to take care that while the doctors differ the patients shall not die. There can be no doubt that this great Pharmaceutical Society possesses many privileges and much wealth, but with them all it has not managed to obtain the affection or get into its meshes the large United Society of the Chemists and Druggists. With a view of guarding the public interests, it is the duty of the House to see that some regulation shall be made by which the sale of poisons shall be efficiently protected. (Hear, hear.) Now, so far as I understand the Bill of my honourable and learned friend, it provides that no person shall make up any prescription unless he shall have previously gone through these examinations, (hear, hear,) conducted under the supervision of the council of the Pharmaceutical Society. Now the House will agree that it is a great pity that this great and important subject, most important to every person in the kingdom and to everybody's home,—I say it is a great pity that this great subject should be a bone of contention between these two large and respectable Societies. (Hear, hear.) I think it would have been better that these two Societies should have come together, and have agreed upon a scheme which should not have affected free trade. These Societies ought to have mutually agreed upon the principles of a Bill which should not have interfered with the freedom of trade, but which at the same time should give the public at large that protection which is absolutely necessary in regard to the sale of poisonous drugs. The United Society of Chemists and Druggists—the larger Society—have, so far as that Society is concerned, made certain advances to the Pharmaceutical Society to that end, and in that respect that Society have placed themselves right in that point of view. And, in the hope of promoting harmony between the whole body of Chemists and Druggists, they suggested in the interests of the people, who are more particularly concerned, that there should be one general measure which might meet with and be introduced in this House under the sanction of all parties. (Hear, hear.) I think that this would have been a better course for the great Pharmaceutical Society to have followed. (Hear, hear.) It might have prevented many disputes between the two Societies. The suggestion was however rejected by the Pharmaceutical Society, and the House will see that, so far as the natural interests of the United Society are concerned, they have been driven to bring in a Bill of their own. As the Pharmaceutical Society would not recognize the appeal made to them, no one will deny that the United Society have taken the proper course. The House will see that the Pharmaceutical Society not only would not recognize the larger Society, but they wished to force the United Society to come into Parliament under the shadow of their wings. The Secretary of the United Society wrote a letter to the Secretary of the Pharmaceutical Society in the month of February, 1864, suggesting that the secretaries of the different branches of the United Society in various parts of the country should meet together and make some overtures in reference to the important and difficult subject under consideration, and it was also suggested that some general arrangements should be made. The letter which was written stated in effect, that the Council of the United Society had received several communications from the different district committees, in which were contained resolutions strongly recommending them, and pointing out the desirability of a co-operation with the Pharmaceutical Society with reference to the proposed new Medical Bill. The letter further stated that the matter had been taken into consideration, and that the Council of the United Society were deeply impressed with the importance of the results which would follow from acting together in a cordial and friendly spirit, with a view of obtaining an Act of Parliament for the extension of the Pharmacy Act of 1852, and which should recognize all existing interests, and which should provide a full and fair representation of the trade. In that respect my honourable and learned friend's Bill and my own do not agree, because it appears to me that my honourable and learned friend's Bill does not provide for a fair representation of the trade at large, for the Pharmaceutical Society proposes to regulate the trade under their system of examinations and to receive certain fees, and that Society do not propose to regulate the trade unless the members of it become members of their Society. The letter further suggested the consideration, or expediency, of ascertaining an inexpensive mode of examination. Now, upon that point, it is necessary to observe that under the system carried on by the Pharmaceutical Society the charge for the examinations, if I have made the account out correctly, amounts to something like the sum of ten guineas. Now, I think that this is a sum which is much too large for persons to pay for being allowed to sell medicines, and to make up physicians' prescriptions, and to sell domestic articles; I think that such a sum should not be required. (Hear, hear.) But, in addition to that sum, there will be the expense of coming up to London from all parts of the country for the purpose of undergoing the examinations prescribed by the Pharmaceutical Society. It has been represented to me that the expenses necessarily attendant on such a course of examination, and in residing in London for that purpose, will not be less than thirty or forty guineas more. (Hear, hear.) Therefore, I say, that the Pharmaceutical Society ought not to require an examination of such an expensive sort, and which will put it out of the power of many persons to undergo. It was suggested that the Pharmacy Act should not be interfered with without consent, and I am informed that there is no intention upon the part of the United Society to interfere in any way with the privileges of the Pharmaceutical Society. On the contrary, what is desired is that every Chemist and Druggist shall be left to please himself, and if he wishes to raise himself high up in his profession, that he shall go through an examination with a view of taking a higher degree, and if he does do that he may place upon his door the fact that he had passed an examination under the regulations of the Pharmaceutical Society. The letter to which I have referred asked whether, having regard to the interests of both Societies, a conference might not be had with a view of discussing all propositions, and I will read the answer which was sent by the Pharmaceutical Society. It was to the effect that the letter of the Secretary of the United Society had been laid before the Council of the Pharmaceutical Society, and that they had instructed their Secretary to inform the United Society that their Bill would be brought before Parliament, and it was hoped that it would meet with the general approbation of the Chemists and Druggists. Now, the House will see that the reply does not recognize the suggestions made by the Secretary of the United Society, whose letter I have referred to, and they will also see that it is important to all persons in the trade throughout the country that these questions shall be considered. In a subsequent letter the Secretary of the Pharmaceutical Society informed the United Society, in answer to certain inquiries, that a meeting which had been announced was for the members of the Pharmaceutical Society only, and that no other persons could be admitted. Thus the House will plainly see that those whom I have the honour to represent—the United Society—did make advances to the Pharmaceutical Society, and that they were simply snubbed, and there was an end to the communications. Under these circumstances, the House cannot blame the United Society for having, in the interests of the trade generally, endeavoured to bring this subject jointly before the House. There has been great difficulty created by the fact of these Bills having the same title, but although there is the same title there is no further analogy; for, as I have already stated, the Bill of my honourable and learned friend amounts to this, that the Society, which he represents, desires to force all the members of the other Society, and the whole of the Chemists and Druggists throughout the country, into their control, in order that they may pay certain fees; and that being done, nothing more will be heard of the Society. Now the Bill of the United Society, on the contrary, looks to the general interests of the public, and the House will see that there is much more to be done, and that more is required, than is to be found in the Bill of my honourable and learned friend. A Bill, which the Pharmaceutical Society had not made wide enough to meet with the support of the general body of Chemists and Druggists, and the best proof that the Pharmaceutical Society did not command the respect and support of the Chemists and Druggists, is to be found in the fact, that whereas, there were once 4000 members of that Society, there are now only about 2300, while the United Society was composed of a much larger number of members than the Society represented by my honourable and learned friend. I have listened to the observations of my honourable and learned friend in reference to referring these two Bills to a select committee, and, I think, the House will say, that it is not right or expedient that they shall sit here and listen to a squabble between the members of these two Societies, —a chartered Society, and the other having a Bill before the House,—simply for the purpose of protecting the trade of Chemists and Druggists; I think quite sufficient has been shown to the House, to convince them that the trade generally are not at all satisfied with the proceedings of the Pharmaceutical Society. But it is not for me, or for those whose interests I have undertaken to advocate here, to desire in the least to interfere with the privileges and wealth of the chartered Pharmaceutical Society; I will say that it is desired by the United Society that the other Society shall go on as they have done. But I also say, that the Bill of my honourable and learned friend does not meet with the views or provide for the interests of the trade at large, and one important subject is that respecting the danger to the public, of allowing the sale of poisons by persons who are ignorant and incompetent for that duty. (Hear, hear.) I will not at present go into the details of my own Bill, but will simply state that it is a Bill which does not interfere in any way with those who desire to carry on the trade of a Chemist and Druggist, but it proposes that all Chemists and Druggists, whether Pharmaceutical or others, shall be registered under the provisions in the Bill. This was a proposal made by the Medical Council at the time when their Act was passed in 1858. I firmly believe that if this Bill and the Bill of my honourable and learned friend shall be referred to a select committee upstairs, they will be able to smooth down all difficulties, and that they will make something out of the two Bills, notwithstanding that the difficulties at present appear to be great. (Hear, hear.) Under these circumstances, the wiser course to pursue will be to refer both Bills to a select committee. (Hear, hear.) This is the course which I and those whom I represent desire shall be followed with the Bill which I have had the honour of introducing. Though I know this is a very difficult question, I will take the liberty of suggesting that the proceedings of the Pharmaceutical Society shall be looked into by some independent body, for when we find a Society like this in existence, —a Society which has hitherto shirked the question of the sale of poisons, but one which it is for the interests of the public shall be taken up,—I think the Government ought to look into it, and they ought to consider this important question. Hitherto they have not done so. (Hear, hear.) This being the case, and after the strong representations which have been made upon both sides of the House of what practically goes on in the agricultural districts, where everything from laudanum to a pair of boots is sold in the same shop, and even in London, it is quite time that this trade in poisons shall be regulated. (Hear, hear.) I believe that many gentlemen have given their attention to the subject, and that upon the evidence which will be brought before a committee, they will be able to frame a good Bill out of the two Bills before the House, and a Bill which shall be a good and useful public measure of safety. (Hear, hear.) I believe that my Bill may be made a useful measure, and that my honourable and learned friend's may be combined with it, on the principle that the smaller provisions may be combined with the larger; and, I think, it may be so arranged, that all persons who dispense prescriptions shall undergo an examination. I again state that I do not wish to interfere for a moment with the privileges of the Pharmaceutical Society, but, on the contrary, I should be glad to see Chemists, desirous of raising themselves in the grade of their profession, taking advantage of the examinations which may be afforded. But I cannot assent to the principle of forcing the whole of the Chemists and Druggists to pay for those examinations when they can be registered for a very small amount. (Hear, hear.) I shall have no objection to the second reading of my honourable and learned friend's Bill, if it be done with a view of referring it to a select committee, and, upon this understanding, I will also agree to refer my bill to the same committee. I have made more observations than I at first intended to do, and for the patience with which I have been heard, I am much obliged to the House. I hope, that upon due consideration, and after the committee have listened to the evidence of the trade at large, they will frame a Bill which shall satisfy and take care of the interests of the public at large.

Dr. Brady.—This certainly is a most important Bill, and one which it is absolutely necessary should be passed into law as early as possible. It is wonderful how a country like this, with so much intelligence and so much wealth, should have allowed so many years to have elapsed without requiring that such a measure should be passed into law. The Pharmaceutical Society has been in existence for many years, and it has won for itself the highest possible character. (Hear, hear.) The Society was established by gentlemen of the highest intelligence, and possessed of great knowledge in the profession and practice of chemistry. Every man connected with the establishment of the Pharmaceutical Society must, from his learning and knowledge of his profession, necessarily command the respect of the whole community, and if honourable Members of this House and the country were aware of the great advantages which have been derived from the establishment of the Pharmaceutical Society, they would not hesitate one moment in passing this Bill which the honourable and learned gentleman has introduced. The examinations instituted by the Pharmaceutical Society would reflect great credit upon any corporate body in the world. There are no better examinations, even under the auspices of the Royal College of Surgeons, than are regulated by this Society. These examinations are fully equal to the purposes intended, and are as good as examinations can be, and therefore I shall give my support in favour of the Bill which has been introduced by the honourable and learned gentleman, and I think if the measure should fail it will be on account of its great moderation in the provisions contained in it. Now what has been the state of things as regards the United Society of Chemists and Druggists? The members of this Society are called Chemists and Druggists, but are they all Chemists? I believe that one-half of them are not, and until a few years ago, and before the establishment of the Society, the general body of the members knew nothing of the practice of chemistry, and they knew less of the first principles of chemistry, but still they were styled Chemists and Druggists, and they put up their names as such over their shop-doors. To obviate such an unhappy state of things the Pharmaceutical Society was instituted, and the object of this Society was to elevate the character, and to educate a better class of men for the business of Chemists. The Pharmaceutical Society has done that, and it deserves well of the country. The honourable Member who opposes this Bill, I mean the honourable baronet, the Member for Westminster, who has introduced another Bill under the same title, says that the Pharmaceutical Society is not now in such a prosperous state as it formerly was, inasmuch as the members once numbered over 4000, and that now they have dwindled down to about 2300.

Sir J. Shelley.—Yes, from over 4000.

Dr. Brady.—Now, when the Pharmaceutical Society was first established, when it first came under the protection of the law, many highly respectable gentlemen who were Chemists and Druggists joined the Society; but as years have passed away, those gentlemen who had given their assistance in instituting the Society have gradually ceased to be members, and now the Pharmaceutical Society is composed of a body of men whose knowledge of chemistry will enable them to compete with any other similar body in the world. (Hear, hear.) I think that a Society composed of 2300 such members is a glorious array. But what is the United Society of Chemists and Druggists? Why, it is composed of all sorts of men, from Harper Twelvetrees down to certain ladies, and it also comprises clerks and apprentices; and all persons who sell drugs, and even mere boys, are members of that Society. Men of education and standing in the profession do not belong to it; they are not among the members who compose the United Society. The late lamented Member for the City of London (Mr. Western Wood) was a member of this United Society, but he was not a Chemist and Druggist, and the same may be said of many others—they have been solicited to allow their names to appear, and they have accordingly become members of the Society. If one went through the list of names he would find many names of persons who are in no way connected with the drug trade, and if all these were deducted from the calculations of the honourable baronet, he would find the United Society dwindle down to almost nothing. I think the Bill of the honourable and learned gentleman will give security to the public; that is the great feature of the Bill, and I think it will have the effect of elevating the Chemists and Druggists, and the dispensers of medicines throughout this country; it will have an effect upon the different branches of the medical profession. To say that a man should be allowed to keep open shop for the sale of drugs, and not to know a sentence of the Latin language, and not to know whence drugs came, and not to know how to dispense medicines, and if decomposition followed, not to know how that arose, is monstrous. All this appears to me to be a warning that something should be done, and that persons so deeply ignorant should not be allowed to mix medicines without a previous examination. This country is in fact far behind Ireland, for in Ireland there has for many years been a magnificent Society, and no man is permitted in Ireland to dispense medicines or medical prescriptions unless he has previously undergone a most searching examination, (hear, hear,) and that examination provides for the safety of the people of Ireland. That Society has educated and elevated a great many persons in Ireland who now follow the business of Chemists and Druggists, but the existence of such a society in Ireland is far less necessary in proportion to the population than it is in this country. (Hear, hear.) Believing that a Bill of the kind introduced by the honourable and learned Member for Suffolk is absolutely necessary, I shall give it my entire support. I may at the same time observe that the complicated Bill which has been introduced by the honourable baronet, the Member for Westminster, could never be carried into operation in its present shape. It is a Bill which professes to be one for registration, and it also professes to be one for the regulation of the sale of poisons and medicines of that nature, combined with regulations for the sale of drugs generally; but it should be remembered that the United Society is essentially a trading body, while, on the other hand, the Pharmaceutical Society is not a trading body. (Hear, hear.) The United Society is, I say, a trading body, and they want to get into their hands the power of allowing the sale of drugs, and of managing those who carry on the trade,—a monopoly which this House will not sanction, but which, if they did sanction, would be highly detrimental to the interests of the public. If the honourable baronet does not introduce a Bill having for its object the prevention of the sale of poisons, and which it is competent for him to do, I hope the Home Secretary will bring in such a Bill, and if he will have such a Bill prepared under good advice, he will confer a lasting benefit upon the whole of the community at large. (Hear.)

Mr. KINGLAKE.—It is not very extraordinary that the honourable baronet, the Member for Westminster, should be able to boast of the United Society having a greater strength of members than belongs to the Pharmaceutical Society, because, if I understand the matter correctly, the Pharmaceutical Society have for a long time adopted, and now propose to continue, a very rigid examination, whereas the United Society have not subjected their members to any examination at all. (Hear, hear.) Therefore I think there is no force in that part of the honourable baronet's argument. (Hear, hear.) When the honourable baronet boasts of the large number of members of the United Society in comparison with the members of the Pharmaceutical Society, it is something like saying how inferior in point of numbers are the wranglers at Cambridge and the first-class men at Oxford to all that large number of men at both Universities who go up for examination in honours, but who obtain none. (Hear, hear.) Now if I understand the matter rightly, the Pharmaceutical Society have actually instituted a machinery suitable in every respect for conducting these examinations; whereas the Society represented by my honourable friend the honourable baronet, have no such machinery, but they must, if their Bill passes, begin their operations *de novo*; and the principle of their Bill is that for the future, and for the future only, shall those persons who become new members be subjected to an examination under the auspices of the Society. And there is an exception as regards all those who up to the present time have been in the actual practice of the trade of Chemists and Druggists. This exception is a most important feature in the Bill, and I think some important alterations in that respect will have to be made in the Bill of my honourable and learned friend opposite, so that all Chemists and Druggists may be placed upon the footing of the Pharmaceuticals. The Bill of my honourable and learned friend will not have my support unless that shall be effected in the most complete manner. There ought to be one form of Register for all Chemists and Druggists, whether they are Pharmaceuticals or not. If the form of Registration be the same, one person will not be able to say that he is entitled to more than another, whether he be or not a Pharmaceutical Chemist. If a Chemist has undergone an examination, there should be no legislative sanction to a plan which may work to the detriment of one class of men and in favour of another. Therefore upon that understanding I will give my support to the Bill of my honourable and learned friend. (Hear, hear.)

Mr. ROEBUCK.—This is a very important subject, and one which the House may feel itself not fully competent to decide without further inquiry before a Select Committee: matters connected the sale of drugs, poisons, and medicines have always been subjected to a careful inquiry before a Select Committee; but, according to the argument of my honourable and learned friend, the great body whom he represents are fully entitled to undertake the part of controlling the business of Chemists and Druggists throughout the country. So far as the matter of examination is concerned, so far as I can judge, the Pharmaceutical Society is justified in saying that they are fully entitled to the confidence of the public, and that they are able to undertake the examination of all persons who desire to carry on the business of Chemists and Druggists. Now, turning my attention to the subject, the first question is, what are the Government going to do in reference to it? Are they going to do anything? for, upon the course which the right honourable gentleman the Home Secretary may take shall I feel myself bound, because this is a matter which falls particularly within the right honourable gentleman's cognizance. (Hear, hear.) I am rather surprised that the Bill is not in the hands of the Government. (Hear, hear.)

Sir GEORGE GREY.—I confess that the subject is a very important one. I have no objection to the second reading of the Bill of the honourable and learned gentleman opposite. (Hear, hear.) I think that the Pharmaceutical Society is a very useful one; and if there are to be examinations of Chemists and Druggists, those examinations may with safety be placed under the direction of the Council of that Society. But there is no doubt that these subjects require very careful consideration. The honourable and learned gentleman was quite right in saying that Bills having reference to medical subjects have hitherto been very carefully inquired into. That was the case with the Pharmacy Act, which received the close attention of a Select Committee of which my right honourable friend the Member for Kilmarnock (Mr. Bouverie) was chairman, and the Bill which was brought in was, after a careful inquiry, most essentially altered by the Select Committee, and the House adopted the recommendation of that Committee. (Hear, hear.) It was the same as regards the Medical Registration Act of 1858, as to which I recollect the difficulty that was experienced in bringing together the different branches of the medical profession; and it was only after repeated communications that gentlemen could be induced to come before a Select Committee; but after a careful inquiry before that Committee, an amended Bill was submitted, which met with very general concurrence, and which Parliament ultimately adopted, with the approval of the medical profession. (Hear, hear.) I have received representatives of the Pharmaceutical Society, and also representatives of the United Society of Chemists and Druggists, and my advice to them all was that they should meet together and endeavour to agree upon a general outline of a Bill. (Hear, hear.) I carefully considered the Bill of the Pharmaceutical Society. I may say they wished me to introduce it; but I could not undertake to do so; and I pointed out certain objections to the Bill. Unhappily, though it was perhaps not a matter of surprise, there were mutual jealousies existing among members of the same profession, and the difficulty was, that it was almost impossible to bring them together and induce them to agree to the principles of a Bill, or agree to one Bill. Now, the Bill of the honourable and learned gentleman opposite is good as far as it goes, but it professes to deal with only a very limited portion of the subject. (Hear, hear.) It proposes to provide only an examination for Chemists who are to make up the prescriptions of medical practitioners, and it omits all reference to a large portion of those persons who carry on the trade or business of Chemists and Druggists. (Hear, hear.) In the other Bill, which has been introduced by the honourable baronet, the Member for Westminster, there are important provisions which relate to the sale of poisons and deleterious drugs, and it would be extremely desirable when dealing with the subject to embody these provisions. (Hear, hear.) I think there are in both Bills points which recommend them to the consideration of this House, and I think also that both Bills should be referred to a Select Committee, with power to take evidence and call persons before them; and they may also bring before them the representatives of the conflicting societies and also persons who are engaged in the business of Chemists and Druggists. Now, if this be done, a Select Committee may be able to make one good Bill, and thus effect to the fullest extent the object in which we have so deep an interest. The course, therefore, which I would recommend is, that both Bills shall now be read a second time, and then referred to the same Select Committee; and that is the course which I think will be the most satisfactory to the House. (Hear, hear.)

Lord Elcho.—Mr. Speaker, I wish, Sir, to say a few words upon this Bill. I have come down to the House prepared to vote for this Bill, and if the honourable and learned gentleman still presses it to a division I shall be prepared to follow him into the lobby; and I do so although I declined to bring in the Bill which he has brought in, and which is now under the consideration of the House. I was asked by the Pharmaceutical Society to undertake the conduct of this Bill through this House for the reasons, as I apprehend, that in 1858 I took a very active part, from feeling strongly on the subject, in the Medical Reform that was much needed at that time, both with regard to the standard for education and the number of bodies, and amongst others the Archbishop of Canterbury, who granted degrees, all bidding one against each other. At that time the standard of medical education was very low in consequence, and it was then thought desirable that as certain bodies had a monopoly of our bodies, and those who had qualified themselves at Edinburgh, Glasgow, and other parts, were not allowed to attend us except with the fear of a prosecution, which however never took place, that we were not doing justice to the public nor to the medical profession in allowing such a monopoly to be established, and when the Council of the Pharmaceutical Society came to me I pointed out, that by their Bill they went a little too far in one respect, and that an injustice would be done to one class to whom my honourable friend the Member for Westminster has not done justice, namely, to those who keep what are called village shops. I hold that whatever this House does with regard to the large body of Chemists throughout the country, that you must allow those persons who keep these village shops to sell drugs, but regulate, if you can, the sale of poisons, and also allow them to dispense prescriptions. I feel strongly upon this point; for it happened that last year I met with an accident in the Highlands which rendered it necessary that I should hav a prescription dispensed, and I accordingly went to the village for that purpose. I went into a village shop or store there, and I inquired where I could have it made up, and I was directed to the Post-Office. I there found that the person who kept the Post-Office, and dispensed medicines, sold hobnailed shoes, hobnails, fiddles, and a variety of other things, and there was besides attached to the establishment a circulating library. (Hear, and laughter.) I said to the man, "Good heavens! why you seem to sell everything here, from hobnails to fiddles;" and that was really the case. The man, however, went into a back shop and got out certain compounds, made up the prescription, and I derived great benefit therefrom. (Laughter.) Now, you must leave a discretionary matter in these things, because you cannot expect men of that class to submi to an examination, and it is for the interest of the public that that class of persons shall exist. (Hear, hear.) I therefore told the promoters of the Bill that unless some provision was made for guaranteeing the existence of that class of persons I could not bring in the Bill; and I subsequently was informed by them that the honourable and learned gentleman had undertaken to take charge of it without qualification, and that he intended to ask the leave of the House to introduce it. We have now two Bills before us; one of them is promoted by the Pharmaceutical Society and the other by the United Society of Chemists and Druggists; and, having looked over the latter Bill, I find that having objected to the Bill of the honourable and learned gentleman as not being sufficiently liberal, I find that the Bill of the honourable baronet, the Member for Westminster, is still more illiberal. All that the Bill of the honourable and learned gentleman professes to do is that these gentlemem shall be registered, and that they shall not be allowed to dispense medicines unless they are registered. The honourable baronet's Bill, on the other hand, says that no man shall sell drugs of any description, whether poisonous or not, unless he shall be registered.

Sir John Shelley.—No, that is not so.

Lord Elcho.—I will read the words of the 14th Clause, which are as follows:—"All persons now keeping or who shall hereafter keep shop or store for the retailing of drugs, and all persons who shall be in any manner engaged in retailing or dispensing dangerous drugs." I maintain that the class of persons I have referred to cannot be expected to be examined in any way, if this Bill is to have any effect in raising the standard of education, and, therefore, I maintain that the honourable baronet's Bill is more illiberal than than that of the honourable and learned gentleman's opposite. Let us for one moment look at the two Societies by which these two Bills are brought in. The Pharmaceutical Society has existed ever since 1841. I have, within the last two hours, visited the hall belonging to that body, and I must say that I was immensely struck by all I saw there. The Society has a perfect library and museum, an admirable laboratory, and a great lecture-room. They are, in fact, an educational body, and I maintain, that if you are going to build a superstructure it is better to have a sound than an unsound foundation to build upon, and the foundation of the Pharmaceutical Society is so much better to build upon than that of the United Society of Chemists and Druggists, that it is on those grounds that I have come down prepared to support this Bill in preference to that brought in by the other Society. (Hear, hear.) Now what is the other Society? (Hear, hear.) I have the Bye-rules of that Society, and I find from them that they are nothing more nor less than a Trading Society and a Benefit Society. (Hear.) The first rule is the establishment of a benevolent fund for the assistance of the members in sickness, in destitution, or at death. They also promote the early closing movement, and they look after all questions for the especial benefit of the trade. They have no hall, no museum, no library, and all they have is a ten-shilling room where they occasionally meet; and they are nothing more or less than a trading body. They are nothing more than a Chemists and Druggists' trading club, and no matter what are their members, they cannot be put on the same footing as the Pharmaceutical Society, which is an honour to the country, and upon which the late Jacob Bell, who was at one time a well-known member of this House, and who, I am sorry to say, died some years since, spent money in raising and endowing. It is evident from the feeling of the House, that it will not take the responsibility of deciding the merits of these two bodies, (hear, hear,) and I am strongly of opinion that her Majesty's Government instead of handing over, as is too much the fashion nowadays, the responsibility of the Government to a committee upstairs who are to deal with the subject, that the Government should undertake all measures connected with so important and vital a subject as regulating the sale of poisons; but as the right honourable baronet, the Secretary of State for the Home Department, has stated that he is not inclined to take it up on the part of her Majesty's Government, and has suggested that it should be referred to a select committee, and seeing the feeling of the House upon the subject, I would suggest to the honourable and learned gentleman to consent to this Bill being sent before a select committee. If however, the honourable and learned gentleman presses his motion to a division, I shall vote with him, but I would recommend him to adopt what is apparently the feeling of the House, that both Bills shall be referred to a select committee, (hear, hear,) from the labours of which committee I hope to see as good result to the Chemists and Druggists as has been accomplished for the medical profession.

Mr. Beecroft.—I hope the honourable and learned gentleman will consent to this Bill being sent before a select committee, to be considered with the Bill of the honourable baronet, the Member for Westminster, which I presume the House will also read a second time. If the course proposed with reference to the Bill before the House is acceded to, I will take the liberty of reading a short extract from a letter I have this morning received from Mr. Reynolds, the Local Secretary of the Pharmaceutical Society at Leeds. He says, "The tribunal of a select committee will show how much the Pharmaceutical Society has done, and personally I shall rejoice at the Bill being so treated. The basis of Sir F. Kelly's Bill is sound, though it should be made more conciliatory, by giving a jury exemption and additional facilities to existing Chemists towards entering the Pharmaceutical Society. It is a fact that there are a considerable number of Chemists and Druggists well qualified to become members of the Pharmaceutical Society, and it renders it both just and politic to act liberally towards such persons." Under these circumstances, I hope both Bills will be sent to a select committee, so that both may have a fair hearing, when I have no doubt such a compromise will be arrived at as will be satisfactory to both parties.

The Speaker then put the motion that the Bill be read a second time, which was agreed to.

Sir Fitzroy Kelly.—I will only detain the House for a moment. I must admit, with great reluctance, that after the appeal of the right honourable gentleman, the Home Secretary, the noble lord opposite, and others favourable to the Bill I have had the honour to introduce, that it should be referred to a select committee, I do not feel that I ought to oppose it. (Hear, hear.)

The Speaker then put the question that the Bill be referred to a Select Committee, which was agreed to.

CHEMISTS AND DRUGGISTS (No. 2) BILL.

Sir John Shelley and Mr. John Locke having presented petitions in favour of this Bill,—

Sir John Shelley.—It is not necessary that I should detain the House with more than two or three words in moving the second reading of this Bill; but before doing so I desire to correct a misstatement of my noble friend's with reference to one portion of a clause of my Bill. I believe it will be found when the Bill is before the Select Committee that we have taken care in every possible way not to interfere with the case of the village shopkeeper, and that he will be enabled after the passing of this Bill to sell all those drugs which he does at present, such as rhubarb and those things which do not require over-much care; but where he deals with dangerous drugs, then he will have to go through an examination. Now, with regard to the Pharmaceutical Society, I had hoped that I had endeavoured, as far as possible, not to say one word against the good they have done. (Hear, hear.) I admit what that Society has done; but it must be remembered, and it is perfectly well known to the honourable and learned gentleman, that the members of the Council of that Society, who were in business before the charter was obtained, are non-examined persons; that out of the 23 members only 3 have passed an examination, 607 members out of 2005 members have passed no examination whatever, and are only subscribing members, and no better than the United Society of Chemists and Druggists. All those matters which have been referred to, such as Mr. Harper Twelvetrees and other things, will come before the Select Committee; and I am very glad to find that the House has adopted that course with reference to these Bills, because I firmly believe that between the two Bills great good will result; and I can only say for the Society which I represent, there has never been any other wish and intention than that the two Societies should come together and act for the good of the whole community. I now move, Sir, that this Bill be read a second time.

Colonel Sykes.—I hope the Select Committee will take into their serious consideration how far it is desirable that the dispensers of medicines in villages should also be dealers in fiddles, hobnails, and the like, and dispensers of medicines at the same time.

The motion for reading the Bill a second time was agreed to, and also that it be referred to the Select Committee upon Sir Fitzroy Kelly's Bill.

CHEMISTS AND DRUGGISTS BILLS.

On the motion of Sir Fitzroy Kelly, the following Members have been appointed on the

SELECT COMMITTEE :—

Sir Fitzroy Kelly ....East Suffolk.
Sir John Shelley ....Westminster.
Lord Elcho ....Haddingtonshire.
T. G. Baring..................Penryn and Falmouth.
Dr. Brady ....Leitrim.
F. C. Hastings Russell ...Bedfordshire.
Charles W. Wynn ....Montgomeryshire.
A. S. Ayrton ....Tower Hamlets
G. Sclater-Booth ....North Hants.
W. Cox ....Finsbury.
H. W. Schneider ....Lancaster.
Sir J. Fergusson ....Ayrshire.
Charles Forster...............Walsall.
J. A. Roebuck ....Sheffield.
Adam Black ....Edinburgh.

April 6, 1865.

REPORT OF THE COMMITTEE OF THE MEDICAL COUNCIL ON THE PHARMACY BILL.

REPORT.

The Committee appointed on April 7th, 1865, to report whether the Medical Council is charged under the Medical Act with any duty in relation to medical and surgical practice by chemists and druggists, and also to consider and report on the two Bills relating to Pharmacy now before Parliament, report as follows:—

In 1864, the General Medical Council represented to her Majesty's Government the necessity of regulating by statute the practice of pharmacy by chemists and druggists throughout the kingdom. The committee are of opinion that this necessity continues as cogent as ever; and that the Council ought to encourage and support any approved measure for effecting such legislation.

Two Bills for the purpose have been introduced into the House of Commons during the present session, one promoted by the Pharmaceutical Society, the other by chemists and druggists not belonging to that body. The Bill of the latter is confined to England and Wales, that of the former to Great Britain.

After carefully considering both Bills, the Committee are of opinion that the preferable mode of legislation is that which adopts the Pharmaceutical Society with the Pharmacy Act of 1852 as a basis. They think the Bill promoted by the Society well fitted to attain various important objects, and reasonable in its demands for powers and privileges.

The main objects of the Bill are to form a register of legally-qualified Pharmaceutical

Chemists; to prohibit the use of certain pharmaceutic titles by persons not on the Register; to confine to those registered the privilege of executing the prescriptions of medical practitioners, subject to the provisions hereinafter named; but not to restrict the sale of medicines asked for in any other manner.

The Committee desire to bring before the Council certain defects which it appears to them necessary to correct before the Bill becomes law.

1. The Bill should be altered so as to apply to Ireland, as well as to England and Scotland. They are not aware that any state of things exists in Ireland to render the regulation of pharmacy by the State less necessary there than in Britain.

2. The Committee are of opinion that a clause should be inserted in any Pharmacy Bill, rendering it imperative on chemists and druggists to follow, in compounding prescriptions, the formularies of the British Pharmacopœia, unless otherwise directed by the prescriber.

3. The Committee consider that the promoters of the Bill, probably from a desire to disarm opposition, propose to admit, on too easy terms, into their Society, practising chemists and druggists not now belonging to it. The proposal is to admit all who offer themselves for examination, or who produce a certificate from a qualified medical practitioner that they have been in the practice of dispensing medicines from the prescriptions of medical men before January 1, 1866. The latter alternative implies a facility of entrance which will be apt to lead to abuse. The Committee are of opinion that more satisfactory evidence of qualification should be required.

4. The last important defect in the Bill which the Committee have to notice is, that no adequate provision has been made towards preventing registered Pharmaceutic Chemists from converting themselves into unqualified medical practitioners.

Looking to the history of medical practice in this country, the Committee see great danger to the interests of the public and of the medical profession from the body which will be constituted by the Bill, should it become an Act in its present shape. The General Medical Council, in carrying out the objects of the Medical Act, have raised, and, it is hoped, may further raise, the qualifications of legally-qualified medical practitioners. But their labours will be in vain, should the creation of a new race of unqualified practitioners be inadvertently encouraged by an Act of Parliament. It is well known that many existing chemists and druggists, both members of the Pharmaceutical Society and others, practise medicine, although unqualified by law and not competent by education. To a limited extent this practice may be inevitable, and, at all events, cannot be prevented. But the existence of it gives peculiar facilities and temptations to the Pharmaceutic Chemist to embark largely in irregular medical practice as an unqualified practitioner.

The Committee have considered whether the danger here indicated might not be averted by extending the jurisdiction of the General Medical Council, so as to include control over Pharmaceutic Chemists as well as over practitioners in medicine. But they believe that such a plan is at present attended with difficulties.

By Clause 55 of the Medical Act, chemists and druggists are expressly exempted from the provisions of the Act, so far as the "selling, compounding, and dispensing medicines" is concerned. Nor is there any provision in the Act which gives the Medical Council any greater power to prevent chemists and druggists from practising medicine also, than the Act enables the Council to exercise over all other unqualified medical practitioners. It is plain, therefore, that the Act did not contemplate the exercise by the Medical Council of any control over chemists and druggists; and the Committee consider that it would be unwise to seek to alter the existing relations between the Medical Council and chemists and druggists.

The Committee have further considered whether the danger they have pointed out might be averted by some simple provision in the Pharmacy Bill. By Section 17 of the Bill of the Pharmaceutical Society, it is declared that—

"Nothing in this Act contained shall extend, or be construed to extend, to lessen or prejudice, or in any wise to interfere with, any of the rights, privileges and immunities heretofore vested in, and exercised and enjoyed by any duly qualified medical practitioner."

This clause sufficiently protects medical practitioners in such right of practising pharmacy as they have hitherto enjoyed, but it does not attempt to prevent Pharmaceutic Chemists from practising medicine. Considering their peculiar temptations to practise it, however, some check seems desirable. The Committee suggest that this object may be attained, in some measure, were the following clause to be added to Section 17, viz.

"Or to entitle any person registered under this Act to practise medicine or surgery, or any branch of medicine or surgery."

The members of the pharmaceutic body would thus have constantly before them the sentiments of the Legislature as to the principles on which the Pharmacy Act was founded.

The Committee have reason to believe that the Council of the present Pharmaceutical Society have every desire to discourage the practice of medicine by its members. They, therefore, apprehend that no opposition would be made to the addition of such a clause.

The Committee call attention to the fact that the Bill proposes to confer on the whole body of chemists and druggists the right of dispensing and selling medicines without any control on the part of the Government, except such as is exercised under the Pharmacy Act over registered Pharmaceutical Chemists. The medical profession has not been so dealt with in the Medical Act. The Medical Council is properly restricted in its action by the Medical Corporation and Universities, and is also controlled by the Privy Council. They submit that the whole profession of pharmacy ought to be subjected to some control.

The Committee recommend that the above observations should be laid by the President before the Secretary of State for the Home Department, and the Chairman of the Select Committee on the two Bills.

Signed on behalf of the Committee,

Henry W. Acland, *Chairman.*

PUBLIC OPINION ON THE TWO BILLS.

From the 'Lancet,' April 1st, 1865.

"The question of qualification and registration of chemists and druggists is fast assuming a settlement. Two Bills have recently been presented to Parliament with a view of defining and regulating their position, and of limiting to competent and known men the sale of drugs and chemicals. Legislation on the subject is beset with many difficulties. These difficulties chiefly rest in the apparent conflict of the proposed schemes and the principles of free-trade in matters of general, we might almost add necessary, consumption. These difficulties we believe to be more imaginary than real. Laws which afford general protection must, in some respects, exercise a restriction. The principle of both Bills goes no further than this—that only those recognized by them will in future be permitted to trade in commodities of a nature which pre-argues the necessity of caution in their distribution. Heretofore the efforts of the Legislature to avert the danger resulting from the use of certain materials have been directed chiefly to the materials themselves as instances arose exemplifying the peril of unrestrained traffic in them. Thus, the sale of arsenic is regulated by the 14 Vict. c. 13. To prevent accidents from gunpowder or other explosive substances, their manufacture and storage are controlled by the 23 & 24 Vict. c. 139. The storage of petroleum is governed by the 25 & 26 Vict. c. 66. These measures are, to a certain extent, examples of Government interference and restriction in the manner of trade and manufacture when the general welfare of the public is brought into competition with the personal interests of the few. Public safety is thereby reduced to a matter of police. It has been long felt that the absence of legislation to limit to competent men the sale of drugs and chemicals of at least a known character, was an omission that could not be safely permitted to continue. It has been argued that any measure partial in its provisions would be practically of little real service; and any Act absolute and general would be oppressive. So many drugs and chemicals enter largely into the daily consumption of the artisan, mechanic, and housekeeper, for the practical purposes of their art, manufacture, or establishment, that to limit their sale or separate them from the ordinary articles of trade purchasable at the general dealer's, it is affirmed, would be productive of public inconvenience, and an undue curtailment of commerce. We admit that in theory many arguments may be urged against restricting the sale of such materials. When, however, the matter is approached in a practical spirit, we recognize the absolute necessity for some control other than that which has hitherto been exercised. It matters little that arsenic must be coloured with soot or indigo, so long as materials equally deadly and far more subtle can be procured from the same seller. In these days of alkaloids and essences, arsenic is but a vulgar instrument. It is true that by the 23 Vict. c. 8, to administer any poison or noxious thing with intent to injure is a misdemeanour; but to sell it is a matter of mere mercantile adventure, requiring on the part of the vendor a knowledge neither of its dangerous character and probable effects, nor of anything about it other than its trade price and retail value. This condition of affairs excited the attention of earnest and good men, who called to their aid the co-operation of the worthy members of their craft, who in 1841 established the Pharmaceutical Society, for the purpose of advancing chemistry and pharmacy, and promoting a uniform system of education for those who should practise the same; and also for the protection of those who carry on the business of chemists and druggists. This association, from the excellence of its design, attracted to its membership a large number of the better classes of the chemists and druggists of that day. In 1843 it became an incorporated society, and in 1852 received special parliamentary recognition. Were the Pharmacy Act of 1852 obligatory, further legislation would not be needed. As, however, outside its provisions there is a very large number of men who traffic in drugs as a mere matter of commerce, the necessity has arisen for some regulating measure whereby at least the safety of the public may be ensured. The Pharmaceutical Society, which has afforded such valid proofs of its high public spirit and due appreciation of what is required, is known to have given much attention to the preparation of such a Bill as might meet the more prominent necessities of the case. Any suggestions put forward by that society are entitled, therefore, to be received with consideration and respect.

"The Bill introduced by Sir Fitzroy Kelly is the result of long and mature deliberation of the Council and members of the Pharmaceutical Society. It is a temperate and well-considered measure. It involves registration of those who at present have a vested interest in the business of a chemist and druggist, and requires from those who may in future become members of the body, or use its titles, the passing of an examination and proof of qualification. So far as this Act goes it is complete, and, we venture to affirm, deseving of confidence and support. It limits its restrictions to those 'keeping open shop for the compounding of prescriptions of duly qualified medical practitioners.' In this respect its provisions and proposed restrictions will be identical with those of the Irish Apothecaries' Company, that rigidly inhibit compounding of prescriptions to those possessing their licence. We would desire a further extension of its provisions, and see them include some regulations whereby the sale of poisons or dangerous drugs would be confined to those whom the enactment is intended to include. The promoters of the Bill have hesitated to do this, through the apprehension that such a complication might endanger the success of their most useful and excellent measure, and also in the belief that a register of duly-qualified chemists and druggists would be necessary as a condition precedent to the operation of any restrictive measure respecting the sale of poisons. Though there is much force in such arguments, we still believe that public attention is now so alive to a necessity for some measure of this character, that Parliament would sanction its provisions. Many Acts on the same subject are undesirable. True, the present Bill is chiefly directed to the purposes of education, qualification, and registration; but we believe it would not be prejudiced by the insertion of such a clause, as it virtually leaves intact the existing condition and privileges of those who do not compound prescriptions. The Bill introduced by Sir John Shelley is allowed to have emanated from the United Society of Chemists and Druggists, which must be regarded rather in the light of a trade association than of a scientific body. The provisions of this Bill are crude and ill-considered. While that introduced by Sir Fitzroy Kelly proposes an amendment and extension of an existing measure, whose operations have been attended with the happiest results, the other contemplates the organization of a new mechanism, the scheme of which bears undeniable evidence of a very imperfect appreciation of the duties or objects for which it is designed. While Sir Fitzroy Kelly's Bill provides for a certificate, from a duly authorized board, of competent skill and knowledge for compounding of prescriptions, which implies a knowledge of drugs and chemicals in their combinations, that of Sir John Shelley limits the qualification 'to a knowledge of the nature of drugs and medicines in general use, with their doses,' and empowers the establishment of a roving commission throughout England and Wales for the purpose of examination. The former measure submits the bye-laws embodying its proposed examination to the approval of the Secretary of State; the latter leaves it a matter of discretion for those to whom such a duty or responsibility may be entrusted. Sir Fitzroy Kelly's Bill proposes to ensure public safety without undue interference with trade; Sir John Shelley's measure unduly interferes with trade without ensuring public safety. Registration and what the Bill terms examination are, by Sir John Shelley's proposal, made the basis for restricting the sale of drugs; whereas the sale of drugs is not affected by the Bill of Sir Fitzroy Kelly further than the compounding of prescriptions. Were the 18th section of Sir John Shelley's Bill, setting forth restrictions and penalties on the sale of poisons, included in that of Sir Fitzroy Kelly, we believe that a measure eminently entitled to public support would be the result. We would fain hope that such may be the case, and that this long-desired measure of protection may at length be conceded. It is satisfactory to know that both Bills have been referred to a Select Committee. The debate in the House was, on the whole, as temperate as might have been expected from those advocating rival measures. It must be gratifying to the Pharmaceutical Society that such deserved honour and praise were rendered to its exertions by all who joined in the discussion. We venture to hope that the measure it has proposed may be practically adopted, even though in some non-essential particulars its provisions be modified"

From the 'Medical Times and Gazette,' April 8th.

"We will venture to repeat here the objections which we have felt it our duty, on behalf of the English general practitioner, to make to these Bills. The existence of a grievance or of danger to the public from incompetent dispensers is not proved nor probable. Even if it were proved, it could not be remedied by Act of Parliament. The good objects of the Bills can all be better obtained by voluntary effort without a Bill. The exclusive privileges it is proposed to confer may be highly inconvenient to the public. The restriction to certain persons of the right of 'compounding the prescriptions of duly-qualified medical practitioners,' makes the whole affair seem ironical, so far as public safety is concerned, because it clearly leaves the field open, and gives virtually legal sanction to unduly-qualified medical men who shall prescribe, and unqualified personages who shall dispense, their prescriptions. Literally it will come to this, that a man, who on an emergency shall make up a box of colocynth pills from a physician's prescription shall be fined £5, whilst he may compound a drink from the receipt of a 'botanist' or sell a box of Morison's pills with the sanction and approbation of the law. Lastly, the habit of counter practice, and of consultations and prescriptions of chemists in their back parlours will increase and multiply, and the regular practitioner be starved, —all for the 'safety of the public.'

"There are, in London alone, hundreds of M.R.C.S. and L.A.C.'s, whose daily income is affected by this Bill. If any of them think about it as we do, we ask them to forward their names at once to the 'Medical Times and Gazette' office, stating whether they are willing to wait on the framers of these Bills to discuss the matter. They must bear in mind that Sir F. Kelly and Sir John Shelley are well disposed to the Medical Profession. but take their tone in the present matter from the very able, energetic men who—small blame to them—desire to aggrandize the Pharmaceutical Society or the United Society of Chemists and Druggists, and to substitute the pharmaceutical chemist for the general practitioner. But if our medical brethren are silent now, it will be in vain to grumble hereafter."

From the 'Saturday Review,' April 8th.

"It seems strange that it should be found difficult to obtain for the British public protection against the dangers which arise from the sale of medicines by persons utterly ignorant of their qualities and effects. But there are formidable obstacles arising, on the one hand, from the reluctance of chemists and druggists to be taught anything, and, on the other, from the fear entertained by some medical practitioners that they may be taught too much. The apothecaries were originally, as their name signifies, nothing more than keepers of general shops, like those which still exist in country places, for the sale of everything from laudanum to a pair of boots. Afterwards they became more exclusively dealers in drugs and chemicals, and it was their business to compound the medicines which the physician prescribed. Gradually they undertook to prescribe as well as to compound, and, at the same time, it began to be felt that some test was necessary of the fitness of men who had assumed such important duties. Ultimately, examinations were imposed, and the apothecaries became established as the most numerous class of practitioners of the healing art. The business of selling drugs and chemicals now devolved upon another class of tradesmen, who have in turn encroached upon the province of the medical profession, and are likely to encroach upon it still more in proportion as they are induced or compelled to acquire some of the knowledge which enables that profession to perform its duties. This, however, is a matter which concerns only a fraction of a class, while it concerns society that nobody should meddle with medicines who does not understand their properties. The objection of the chemists and druggists to being educated will obtain even less sympathy, but it is to be observed that the objection of some of them is not absolutely to examinations, but only to examinations conducted by the Pharmaceutical Society, between which and the Society of Chemists and Druggists, which is of more recent origin, there prevails an intense jealousy. The demands which the existing examinations of the Pharmaceutical Society make in the way of knowledge are not large, and the demands which would be made by the examinations which have been proposed by the Society of Chemists and Druggists seem to be ridiculously small; but whether either of these societies, or some new society, shall be taken to represent the general body of chemists and druggists, is a question which concerns the public only in this respect, that it is desirable that the conduct of examinations, if there are to be any, should be placed in efficient hands.

"Bills have been brought into the House of Commons by both the rival societies, and after some discussion have been referred to a Select Committee, which will endeavour to reconcile their conflicting claims. The older society is represented in the House by Sir Fitzroy Kelly, and the younger by Sir John Shelley. The Pharmaceutical Society was incorporated by Royal Charter in 1843, and in the year 1852 it was empowered, by a statute called the Pharmacy Act, to conduct examinations and establish registers of examined persons and members of the society. The word 'pharmaceutical' is obviously a derivative of the Greek word which is sometimes translated 'poison' and sometimes 'remedy.' A chemist and druggist is a person who deals in all the substances, mineral and vegetable, from which remedies are prepared; and it would seem that the addition of the word 'pharmaceutical' adds nothing to the idea which would be conveyed by the words 'chemist and druggist' simply. But this word 'pharmaceutical' is at any rate a long word, and probably it is understood by those who bear it as designating a chemist and druggist of superior education and intelligence.

"The advantages, whatever they may be, of the designation are, by the Act of 1852, restricted to persons registered under the Act, and no person can now be registered unless he passes an examination, which certainly affords security for the possession of a competent degree of knowledge. It is proposed by Sir F. Kelly's Bill to provide that shops for the compounding of prescriptions shall only be kept by registered chemists and druggists, and that, except in the case of persons now in business, registration shall only be granted on passing the examination of the Pharmaceutical Society. It is certain that the Society of Chemists and Druggists will oppose with all its might the proposal to place the conduct of examinations in the hands of the rival body; and it might be possible and expedient to construct a board which should inspire public confidence at the same time that it conciliated the support of chemists and druggists generally. We do not, however, think that Sir John Shelley's proposal to commit the appointment of examiners to a council to be composed of 'twenty-one gentlemen to be annually elected from the general body of chemists and druggists,' would be likely to inspire public confidence; nor do we think that an examination in 'the nature of drugs and medicines in general use, with their doses,' would secure the possession of adequate knowledge. There is reason to suspect that, under the authority of the twenty-one 'gentlemen,' an easy test would be applied in the mildest possible way. At the present time, chemists and druggists not only make up prescriptions, but actually prescribe themselves to a very great extent. There seems to be no prospect of their being restrained from prescribing, and, therefore, it would be a great public gain to diminish the risk of their committing grievous errors. In this view, the proposal of the Pharmaceutical Society to examine in 'the Latin language, Botany, Materia Medica, and Pharmaceutical Chemistry,' as the test of qualification for a chemist and druggist, does not appear to contemplate an extravagantly high standard. In several Continental countries the ordinary drug-dispenser would pass such an examination without difficulty. There would still be nothing to prevent anybody from putting blue and red bottles in a window, or to restrain the sale of drugs, either simple or compounded; but the use of the designations 'Pharmaceutical Chemist,' or 'Chemist and Druggist,' or 'Chemist,' or 'Druggist,' by unqualified persons, would be prohibited; and if people chose to trust unqualified persons in matters affecting health, they must be left to take the consequences. This, at any rate, is the conclusion of the clients of Sir Fitzroy Kelly, who propose only to prohibit 'carrying on the business of a chemist and druggist in the keeping of open shop for the compounding of the prescriptions of duly-qualified medical practitioners,' as well as the use of the titles above enumerated, by persons who shall not be duly registered.

"It is urged by the opponents of the Pharmaceutical Society that their proposal is better adapted for large towns than for small and secluded villages. Lord Elcho told the House of Commons that, having occasion to get a prescription made up, he had to go to the post-office of a village, which he found to be a store for the sale of almost every article, from fiddles to hobnails. But if a village cannot support a pharmaceutical chemist, it usually does support, although in a poor and mean way, a doctor, as he would be called, who is probably both surgeon and apothecary; and no doubt such a doctor would consent, on an emergency, to make up a prescription of another doctor practising in a more conspicuous sphere. It may be that the far-shooting Apollo, having some family influence over pharmacy, took Lord Elcho under his special care, but it would probably be imprudent in ordinary people to have their prescriptions made up at a village post-office. It would, at any rate, be hard that large towns should not have protection because small villages cannot afford to pay for it. There is an almost immeasurable distance between Professor Faraday and a shopkeeper who displays coloured bottles on one side of his door and grocery on the other, and yet both are called chemists. It may be that the heads of the Pharmaceutical Society belong rather to the class of the professor than to that of the country shopkeeper, and it is possible that, if they were uncontrolled, they would fix the standard of examination higher than would be suitable to the wants and duties of that numerous body of persons who, although Sir John Shelley's Bill makes them gentlemen, would not object to be called tradesmen. But it would be easy to correct this tendency, if it exists, by infusing a little common sense into the proceedings of a body which possibly sets too high a value upon science. There can, however, be little doubt that the Pharmaceutical Society, whose examinations are satisfactory to the medical profession, and are the only recognized examinations for army dispensers, will satisfy the Select Committee that it deserves an increased amount of public confidence. Whatever be the means employed, it is to be hoped that Parliament will ensure the competency of persons keeping open shops for dispensing medicines and compounding prescriptions."

From the 'Scotsman,' April 5th.

"Men busy themselves often the least with that with which they have the closest connection; or they busy themselves only with it in part, forgetful that the arrangement which is not complete everywhere is complete nowhere. Thus the Legislature has recently given us, by means of a register recording the names of all duly authorized for medical practice, the opportunity of ascertaining the identity and qualifications of those whose momentous duty it is to bestow that guidance and aid in times of sickness and suffering, which few are inclined to slight, unless when the need of them can be contemplated at a distance. But the ablest of medical practitioners is no unfettered autocrat, who has but to direct wisely in order to have his injunctions fulfilled faithfully and successfully. In addition to the docility of the patient, and the assiduity of the nurse, he must have, what is most to the present purpose, the skill and care of the compounder and dispenser of medicines to sustain him in his efforts, otherwise his best-devised plans may prove but a source of failure, in the worst of forms of deception and disappointment, to himself and to his charge. And yet the public, however lavish its faith, and whatever the real merit of individual exceptions, has no existing guarantee that the larger portion of those who assume the function of the compounder of medicines, or of chemist and druggist, as they generally prefer to style themselves, may not be so thoroughly ignorant of chemistry, and of the characters and qualities of drugs, as to fail even to stand appalled by the shame of their own incompetence. This is no pleasant reflection for the medical practitioner, and ought to be none for a public which, even while the most devoted to freedom of trade, may yet well pause before tolerating a licence that tampers with life by simulating and vitiating science. And it is the less agreeable when we find one authority after another abroad, the highest in medical policy and in the art of healing, exclaiming with pity against the blindness and recklessness of a country which leaves such specially important interests to such false and defective handling.

"It was but in giving voice, then, to the feelings of the medical profession, and in the exercise of a becoming solicitude for the public credit and welfare, that the General Medical Council, constituted under the Medical Registration Act, came lately to the resolution:—

"'That a communication be addressed to the Secretary of State for the Home Department, drawing his attention to the present defective state of the law regarding the practice of pharmacy, under which any person, however ignorant, may undertake it; and expressing the opinion of the General Medical Council that some Legislative enactment is urgently called for to ensure competency in persons keeping open shops for dispensing medicines, and for the compounding of physicians' and surgeons' prescriptions.'

"On the facts and consciousness thus expressed, has ensued the introduction of two separate Bills into Parliament; each bearing the identical title of a 'Chemists and Druggists Bill,' but each emanating from a different source, and differing, too, in the extent of its aims, as in the instrumentality for their accomplishment. The first originates with the Pharmaceutical Society of Great Britain, a body incorporated by Royal Charter in 1843, and which, in 1852, had powers for the examination of Pharmaceutical Chemists, assistants, and students, conferred upon it by Act of Parliament, but only in so far as that examination, and its resulting attestation of competency, might be voluntarily sought for. This Society has now on its registers about 4000 individuals in England and Scotland; and since 1853 it has registered none unless upon previous trial. It has established lectureships, a benevolent fund amounting to £7000, a museum and a library, a laboratory for practical instruction, and a meritorious journal, the agency of which, in advancing and diffusing pharmaceutical knowledge, has been singularly valuable. It now asks to have confided to it, as merely an extension of its present functions, the duty of examining and registering all new entrants on the occupation of chemist and druggist, upon whom such examination is to be henceforward compulsory; and of simply registering, but without subjection to examination, all those already engaged in the exercise of the trade. Thus all present chemists and druggists might acquire, on the easiest of terms, an authenticated and legal position, ascertainable by reference to a single register common to them and to the already certificated Pharmaceutical Chemists; while all future entrants would have their competence duly tried, and attested by their position in the same register.

"The rival Bill emanates from a body designating itself as the Society of Chemists and Druggists of England and Wales, which has existed only since 1861; but of which the public knows little, and the scientific world nothing, inasmuch as, being destitute of all apparatus for study or teaching, whether lectureship, museum, library, laboratory, or journal, it subsists only obscurely, with apparently an approach to the character of a mere trade's guild or commercial protection society. This body seeks also to be elevated into a corporation, and asks from the State that fulness of power of examining and registering members and entrants which the older and more distinguished body already in part possesses; thus aspiring to establish, with exceedingly doubtful expediency, a second order and source of qualification for druggists, to be attested by a second and its own peculiar register. The Bill of the Pharmaceutical Society includes Scotland; and a petition in its favour has been sent to Parliament, signed by 105 chemists and druggists and their assistants resident in Edinburgh. The rival Bill is designed for England and Wales only. The latter Bill embodies a clause regulating the sale of poisons; a matter so important in itself as to deserve a separate enactment, yet which can still easily be provided for by an addition to the former Bill, should it be judged fit by Parliament that the kind of Act contemplated ought to be at once a measure for education and for police—a combination the propriety and advantage of which may fairly be considered debateable.

"But the question at once arises, as to how and wherefore this young Society of Chemists and Druggists has sprung up into fiscal, if not into scientific competition with the earlier Pharmaceutical Society. If it represents, as it assumes to represent, the general body of the craft not yet embraced in the first constituted incorporation, whose merits are sufficiently proved by its public-spirited and widely-appreciated labours, it must obviously include, and so represent also, the bulk of that crass ignorance, to the danger of the existence of which the attention of the Secretary of State has been sought to be drawn by the General Medical Council. Has it, then, been through a fear of the examination that its members, in the mass, have hitherto been held back from offering themselves as associates of the older institution? And is it now only by the pressure of the times that they are compelled at last to devise some less rigorous test of their own, whose leniency and narrowness of range, in contrast with the by no means excessive requirements of the Pharmaceutical Society, may doubtless be more agreeable to the candidate, if less assuring to the public?

"Such a degree of leniency appears, indeed, to be not indistinctly indicated in the thirteenth and fourteenth clauses of their Bill. But the plea of costliness, it is of course natural to expect, is one more likely to have been advanced here than that of reluctance through consciousness of defective knowledge; and yet even this, it seems, could have been urged with only scanty reason. The comprehensively instructed and rigorously tested *pharmacien* of France, receiving his attestation of competency at Paris, pays for it 1200*f*., or £48 sterling. If he appear before a commission in the departments, the expense is only 350*f*., or £14 sterling; but in the latter case he can pursue his vocation within only the particular department of country in which he has been admitted, while in the former the whole empire is open to him. But the Pharmaceutical Society gives its ordinary certificate of competency, available everywhere, for £5. 5*s*.; and its highest attestation, qualifying for election for its membership, costs only twice that sum. The regulations for study and for examination in Germany and Sweden are, like those of France, lying before us, and certainly none need complain of the rigour of even the highest tests hitherto proposed at home, who are familiar with those known to be prevalently required abroad. It may be significant to our chemists and druggists, who have assumed these titles without previous trial and proof of competency, that, by a law still in authority in Germany, all those similarly placed are strictly prohibited from preparing and dispensing medicines; being particularized to this end along with a motley tribe of others, embracing distillers, itinerant quacks, Jews, shepherds, executioners, honorary doctors, old wives, and charmers.

"Manifestly, then, this is a subject on which legislation is demanded, that the public may be protected from the possible danger, positive or negative, which arises from its present ignorance as to who is, or who is not, properly qualified by skill and knowledge for the sale and dispensing of medicines and prescriptions; and, almost equally manifestly, it seems reasonable to be to that body which has hitherto shown the greatest energy and zeal for improvement, and upon which, besides, a large measure of authority of an approximate description has already been conferred by the State, that the instrumentality should be entrusted for carrying the law into effect. All antecedents are in favour of the Pharmaceutical Society, while those of the Society of Chemists and Druggists are worse than null. Even their projects for the future are such as to involve a retrogression when compared with those of the earlier institution. There must unquestionably be much individual merit in the ranks of the newer society; and yet it is painful to the expert to remark, in the very schedules appended to the Bill proffering its claims, such medicines as lettuce, and ipecacuan, and, above all, grains of paradise, classed as dangerous drugs, along with nux vomica, opium, and oxalic acid; while, among the active poisons, ergot of rye is placed beside strychnine and atropine, and prussic acid is omitted. From the Pharmaceutical Society such defects and incongruities of classification could never have proceeded. It is for the Bill emanating from this body, therefore, that upon the whole, success in Parliament seems the more desirable, in the best interests of the public. Doubtless, it may undergo some amendments in committee; and perhaps among these should be introduced a provision allowing bodies of examiners (as, indeed, is already permitted, at least for Scotland, in the Pharmacy Act of 1852) to be named and to act in a few of our more populous cities, besides those sitting in either capital, in order to promote economy and convenience on behalf of the candidates. The obligatory presence of assessors, delegated from the Royal Colleges of

Physicians and Surgeons, could not fail also to add a further confidence and value to the results of these examinations, whether on the part of the medical profession, the public, or the candidates themselves.

"Objections, too, will inevitably be pressed in committee against the Bill; and one or two of these have already been indicated in the debate on the second reading. Lord Elcho, for example, contended that it was necessary that persons in remote localities, keeping stores to supply all the promiscuous wants of the vicinity, should be permitted to sell medicines, and even to make up prescriptions, although it could not be expected that they should be competent to undergo examinations. Both these points may be passively conceded; for necessity must sometimes rule for them, where there is only a choice between a greater and a smaller danger; and, indeed, the thirteenth clause of the preferable Bill actually gives, in anticipation, all the latitude on the subject that need be desired. On the occasion when his lordship tells us he adventured his own personal experience, we might imagine him asking, after the precedent of the great Condé with the village barber-surgeon, whether the huckster before him was not afraid to administer such services to the son of a peer, a statesman, and a chief and champion of the volunteer movement; and can conceive a repetition of the appropriate answer—'My faith, your lordship, it is for you to be afraid.'"

Articles expressing opinions, more or less identical with the majority of those given above, have also appeared in 'Bell's Weekly Messenger,' 'Birmingham Daily Post,' 'Daily News,' 'Standard,' 'Pall Mall Gazette,' 'Morning Star,' 'Daily Telegraph,' 'Morning Advertiser,' 'Montrose Standard,' etc. etc.

OPPOSITION TO FREE TRADE.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—The Bills now before Parliament will be little or no use to the Druggists of this town. What militates against our interests here is, that nearly or quite every grocer sells drugs. It is much to be lamented that Sir Fitzroy Kelly's Bill will not have the effect of compelling them to desist as soon as it comes into force. However good the Bill may be in one sense, yet it miserably fails to protect the trade,—even members of the Society (like myself), who have had to pay the inevitable price for qualifying themselves for their profession.

Yours faithfully,

W. Rayner.

Sheerness, April 3, 1865.

LETTER FROM MR. BUOTT.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Amongst the numerous statements put forward in the 'Pharmaceutical Journal' for this month which seem to demand correction or contradiction, there is one charging me personally with making an accusation which is "slanderous and untrue."

I have hitherto passed by whatever you may have written or inserted in your Journal reflecting upon me as the mere expression of party prejudice, but, as the cause which I have advocated is now a matter of legislative consideration, and might suffer through my silence, I feel it my duty to establish the accusation I made in the name of others in the columns of the journal which has been the vehicle of that charge against me.

The passage to which I refer runs thus:—

"We cannot avoid remarking on the gratuitous insult which was offered to both by one of the deputation from the United Society to Sir George Grey, who talked of the 'misrepresentations' which had been used to obtain signatures to the recent memorials. Some correspondence from Walsall, bearing on this subject, will be found in another part of this journal. He did not venture to describe the misrepresentations, but we do venture to describe his accusation as slanderous and untrue."

I did not "describe the misrepresentations," that is, I did not give the precise words used by fifty men in fifty different towns, all tending to a common result upon 1000 minds, simply because it was an impossibility. The nature of the effect shows the nature of the cause. The effect was, that something like 1000 members of the United Society were induced to sign a memorial in favour of a Bill which proposed to register and tax them without enfranchising them. Can it be possible that they so understood it? No! Indeed it is a moral impossibility that they should. Then what is the inevitable conclusion? Why have they repudiated their signatures? The answer is what they themselves affirm, viz. that they were deceived as to the nature of the Bill for which they were induced to give their signatures.

But what are the facts? It is indisputable that 100 non-pharmaceutical chemists at Birmingham, with several pharmaceutists and Mr. Snape, the chairman, Mr. Packwood, the secretary, Mr. Miller, Mr. Foster, Mr. Litchfield, and other members of the United Society who signed the memorial, afterwards repudiated their signatures, because, as *they* say (not as I say), the Bill for which they signed had been misrepresented to them. These 100 chemists of Birmingham amply prove my case.

I refer with equal confidence to Wolverhampton. What say Mr. Lowe, Mr. Perkins, Mr. Wedge, Mr. Lister, and others who constitute the petitioners of that town? I think I recollect their statement word for word, because it was uniform. They were, it was intimated, to be freed from the competition of huckstering druggists, and to be admitted to membership with the Pharmaceutical Society. Even at Nottingham, where unusual efforts have been made to stifle the reforming spirit of the United Society, the non-pharmaceutists generally (and some pharmaceutists too) gave their consent to the Pharmacy Bill only upon the condition that the privilege of exemption from jury service should be extended to all chemists brought under its provisions.

But why need I individualize towns? The case of Birmingham is that of the Potteries, of Liverpool, of Manchester, of Hull, of Wolverhampton, of Walsall, and numerous other towns. The statement from each is substantially the same,—that by a suppression of the fact that the non-pharmaceutical chemists to be registered under the Pharmacy Bill were not to be incorporated or represented; or, by the assurance that the Bill had been so altered to meet the wishes of the trade, that they would be relieved from competition with small shopkeepers and grocers, be exempt from jury service, and brought within the pale of the Pharmaceutical Society, they were induced to sign the memorial, and that they repudiated their signatures on finding the impression produced upon their minds by such misrepresentations was not correct. Indeed, even without this direct and incontrovertible evidence bearing upon the case, it is impossible to account for such uniform misunderstanding and such uniform repudiation, except upon the theory of "misrepresentation."

I trust I have said enough to vindicate my character from the aspersion cast upon it. I will do the writer the justice to believe that in his own heart he does not accuse me of wilful untruth and slander; but that he would say "an accusation affecting the reputation of others, unsupported by evidence, is slander and untruth;" and I am willing to accept that qualification, in the absence of any impartial tribunal to which the matter might be referred; but, failing such qualification, I hurl back the charge of slander and untruth upon those who made it, and at their door be the responsibility of embittered strife.

Permit me, Sir, in concluding this hurried letter, respectfully to address a word of remonstrance to those gentlemen who constitute the Pharmaceutical Council. They would have Parliament believe that their Bill is produced out kindness for their non-pharmaceutical brethren. Every Member of Parliament who has read the bitter tirades put into the mouth of Dr. Brady and Lord Elcho, and repeated with increased venom in the 'Standard' newspaper, will, as sensible men, receive such a profession with incredulity, and find a more probable, but less creditable motive for their zeal.

Am I doing them injustice? Are they *really* sincere? Can it be possible they are only evidencing their love for their non-pharmaceutical brethren by abusing them? Seriously, *do* they desire to conciliate them? I will try to believe it. Then let that Council cease at once to insult them by ranking them with the low grade of huckstering druggists who belong as much to the Pharmaceutical Society as to the United Society, which, they must admit, represents the intelligence, the respectability, and the energy of the non-pharmaceutical chemists of the country. Do they wish the non-pharmaceutists of the country to promote the usefulness, the prosperity, the dignity of the Pharmaceutical Society, as the collegiate institution of the trade?—then let the wise counsel of Mr. Procter, Mr. Vizer, and Mr. Reynolds prevail in the eleventh hour, and a friendly smile and a willing hand be extended to the United Society, and all may yet be well.

I am, Sir, your obedient Servant,

C. BUOTT.

20, *New Ormond Street, W.C.,*
April 20, 1865.

[We willingly comply with Mr. Buott's request to insert the foregoing letter. If, in his interview with Sir George Grey, he had stated that the charge of misrepresentation which he brought against our local secretaries was merely founded on inference, his accusation might have passed unchallenged. Every man is entitled to his own judgment, and by different minds the same effect may be traced to different causes. We do not wonder that an effect so startling as the expression of approval of the Bill prepared by the Pharmaceutical Society by members of the society which Mr. Buott represents, should be ascribed by him to any cause but the right one. Mr. Buott may talk of "*moral impossibilities*" and "*inevitable conclusions*," but these are not evidence; and, when speaking of a charge founded on such a basis, we cannot do better than adopt the expression he himself offers us, that "*an accusation affecting the reputation of others, unsupported by evidence, is slander and untruth.*"

As to the "*facts*" which Mr. Buott produces, we still say they do not prove his case, and still deny that any deception was used. The Bill itself accompanied the memorial, and if, on reading it, men could not understand it, or if they chose to sign without reading it, the fault was their own; and as to "*repudiation*," we have taken some pains to ascertain where it occurred and are unable to do so.—ED. PHARM. JOURNAL.]

We have received a communication from Mr. Slugg, of Manchester, in reply to some observations by Mr. Richardson, which appeared in our last number. Mr. Slugg deprecates the language used by Mr. Richardson, and observes, "I did not sign both petitions; I did not admit that I had, and it is nowhere stated that I made such admission. I cannot but express my surprise that a gentleman, who writes F.C.S. at the end of his name, should think so loosely, and read so carelessly, as not to perceive the difference between an admission to have signed a *memorial* to the Pharmaceutical Council, and an admission to have signed *two petitions* to Parliament. I did admit that I had done the former, and that I then repudiated that signature. My reason was this:—I have for the last twenty years advocated the incorporation of the trade and the *compulsory* examination of those who enter it. The lack of such provision in the Pharmacy Act of 1852 was one reason why I refused to enter the Society. I prefer the Bill of the United Society to that of the Pharmaceutical Society, but prefer the latter to none at all; and so, fearing that the same tactics which prevailed two years ago in reference to the attempt to exempt chemists from serving on juries might prevail again, and that our society would not be able to gain that position with the Government and with Parliament which they have since gained, I made the mistake of signing the memorial. When I found the Government were willing to listen to us, and place us on a footing with the other Society, I did what I had a right to do—I confessed I had made a mistake."

ACTION OF PERMANGANATE OF POTASH ON GLYCERINE.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—The prominent position in which glycerine is placed in Dr. Redwood's admirable Paper on the Construction of a Pharmacopœia, will induce many experiments to be made with it. I therefore wish to caution those who may not think twice before they act once, not to attempt the mixture of permanganate of potash, or its solution with glycerine, without taking the same precautions as when operating with nitric acid on that substance. The solution of permanganate of potash is such a harmless and apparently inoffensive substance, that the readiness with which it parts with its oxygen when in contact with organic substances may possibly be overlooked. I have not been caught myself.

Your obedient servant,

George Mee.

8, *Torrington Place, Gordon Square, W.C.*

PREPARATION OF LIQUOR BISMUTHI.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The process for the preparation of "Liquor Bismuthi," which has appeared this month in your Journal, and which came under my notice some little time ago in the pages of the 'Chemical News,' is similar in many important points to one which I have used successfully for more than a year; the latter resulted from a series of experiments suggested by the process of Mr. Tichbourne, which I, like Mr. Gray Bartlett, found impracticable.

Upon the appearance of the communication of the last-named gentleman, in the 'Chemical News,' I tested the method there given. The results in my hands were not satisfactory, the quantity of precipitate formed being scanty in proportion to the weight of bismuth used, and a considerable portion proving quite insoluble in ammonia. I must acknowledge, however, my great obligations to that paper, from which I have largely drawn, since its appearance, for my own process; the proportions there given being almost universally adopted, as well as certain points of manipulation, which will be duly mentioned in the account to be given below. I have thus been enabled to attain for it a certainty and accuracy in which it was previously somewhat wanting, and which will, I hope, recommend it to such operative chemists as will give it a fair trial.

I had intended to reserve the following account for a paper, which I hoped to read before the Pharmaceutical Conference at its next meeting; since, however the subject has been brought prominently forward in your Journal, it will be more satisfactory that it should make its appearance there.

Take of Subcarbonate of Bismuth, 2 oz.
Citric Acid, $1\frac{3}{4}$ oz.
Nitric Acid, 3 oz.
Water;
Solution of Potash;
Spirit of Wine,—of each what is sufficient.

Dissolve the bismuth in the nitric acid, add sufficient water to take up the nitrate precipitated (from two to three ounces); carefully avoiding excess. Dissolve the citric acid in the solution thus formed (which will not be perfectly clear), and add gradually solution of potash (Liquor Potassæ) until the mixture is only faintly acid, and gives, after filtration, but a slight cloud on the addition of more potash. Filter, collect the precipitate, wash slightly (the presence of a trace of nitrate of ammonia in the product is of no consequence), and transfer the precipitate to a dish; add solution of ammonia gradually, until the precipitate is dissolved (a little oxide will remain); filter. Measure 4 fluid drachms of the solution, add excess of sulphide of ammonium, collect the precipitate on a counterpoised filter, wash, dry, and weigh; 261 grains of the precipitate thus obtained represent 237 of oxide of bismuth. Dilute the whole of the solution with water and spirit of wine, in such proportions that a mixture of 1 part of spirit with 7 of water shall contain the required number of grains (I generally prefer 4) to the drachm of solution. In the above process, it is especially necessary to avoid the addition of an excess of potash, which appears to decompose the citrate formed and precipitate an oxide insoluble in ammonia, and this appears indeed to take place to some extent previously to saturation; a slight waste is therefore incurred, by leaving the solution faintly acid, in order to avoid the formation of this insoluble precipitate.

The chief points in which I am indebted to Mr. Bartlett, in addition to those mentioned previously, are the following:—

1. The substitution of carbonate for nitrate of bismuth. The former is far more soluble than the latter, which was used by me in consequence of its supposed greater constancy of composition.

2. The solution of the precipitate in pure ammonia. Before the appearance of Mr. Bartlett's communication, a mixture of citrate of ammonia with free ammonia was used, and heat was applied.

3. The highly important addition of a quantitative analysis. A margin was formerly left to allow for loss (which is not considerable) in the manufacture, and, as above stated, the nitrate of bismuth was used as a more uniform salt than the carbonate.

The weak points in Mr. Bartlett's process appear to be the following:—

1. The great acidity of the solution from which the citrate of bismuth is ultimately separated, causes the precipitation to be extremely imperfect; there is consequently great waste of material and labour.

2. The extreme dilution of each portion of the acid bismuth solution, in the act of addition to the solution of citrate of potash, seems to determine the precipitation of basic nitrate, insoluble in ammonia, before the double decomposition necessary to the formation of the citrate can take place.

I am, Sir, your obedient servant,

THOMAS P. BLUNT, F.C.S.

Shrewsbury, April 4th, 1865.

COCHINEAL COLOURING.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—After having tried many forms for the preparation of Cochineal Colouring, all of which I found had some objections to urge against them, I tried the following with most perfect success. Perhaps expense may be urged against it, but where that is not so much an object, I think it will be found the best receipt hitherto published:—

Best Carmine, ℥j.
Liq. Ammon. Fortiss. q. s., about ℥vj.

Macerate for a few days, and when the carmine is dissolved, *gently* heat the mixture, so as to drive off the excess of ammonia, taking care not to carry it too far, so as to precipitate the carmine. Put this into a wine quart bottle, add—

Sp. Vin. Rect. ℥iv.
Sacch. Alb. lbiij.

Then fill up the bottle with warm water, and shake it occasionally, till the sugar is dissolved.

I am, Sir, yours obediently,
ROBERT PALMER.

ON THE ARSENIC-EATERS OF STYRIA.

BY CRAIG MACLAGAN, M.D., EDINBURGH.

In the spring of this year, at the conclusion of a short residence in Vienna, I resolved to visit Italy, and finding that my route led me through Styria, I thought it might be interesting to endeavour, by personal inquiry, to gain some information as to the reputed arsenic-eaters of that country; and as my travelling companion Dr. Joseph Rutter, of London, was also professionally interested in the question of their existence, we determined to make a short stay at Gratz, the capital of the duchy, and thence to make any excursions into the country, which the knowledge I might acquire should point out as necessary.

My object in the present paper is succinctly to narrate what I learned by actual observation; but before doing so I may be permitted to glance rapidly at the existing condition of our information on the subject.

Although medico-legal observations on this practice had already been made so early as between 1817 and 1820 (Professor Schallgruber, 'Medicin-Jahrbuch des Oestreich Staates,' 1822) in Gratz, the first time that any great interest was manifested in Britain on the subject seems to have been when a paper by Dr. Von Tschudi, which had originally been published in one of the Viennese medical journals ('Wiener Medicinische Wochenschrift,' October 11, 1851), appeared in an English dress, and found its way into many of the popular as well as scientific publications of the time, including 'Chambers's Journal,' and the late Professor Johnston's 'Chemistry of Common Life.'

The embellishments which Von Tschudi's narrative received from other writers, as well as the apparently incredible nature of the original statement, caused it to become a subject of much discussion. The general opinion of scientific men in this country was, that the statements of Von Tschudi were not worthy of belief, and this view of the subject was specially maintained by Mr. Kesteven, of London, in a series of papers which appeared in the 'Association Medical Journal' for 1856, in which he quotes the opinions of the most celebrated toxicologists of the time, in confirmation of his own belief of the practice.

Careful inquiry, however, was set on foot by other scientific men, both British and Austrian. Mr. Heisch, of the Middlesex Hospital, having put himself in communication with persons living in the districts where the practice existed, was enabled to quote several very interesting cases, which were very thoroughly authenticated ('Pharmaceutical Journal,' 1859-60, p. 556), and Dr. Von Vest, the Landesmedicinalrath for Styria, residing in Gratz, having issued a circular to the medical men in his district, asking for information on the subject, was enabled also to arrive at tolerably satisfactory proof of the existence of the custom. The most interesting example of it was communicated to him by Dr. Knappe, then residing at Obertzeiring, in Upper Styria, who had persuaded an "arsenikophagite" to come and live under his observation for a few days, and who not only was thus enabled to see the man take his dose, but was enabled to transmit to Dr. Schäfer, a practical chemist in the Styrian capital, a specimen of the urine passed after the ingestion of the drug, and which was proved to contain it.

The facts ascertained by Knappe were made known in Britain by a paper by Dr. Roscoe, read to the Manchester Philosophical Society, and published in the 'Mechanics' Magazine;' and the existence of the practice has been admitted by some scientific men who have written since the date of Roscoe's paper. Dr. Guy ('Forensic Medicine, 2nd edit., p. 368), admits that Roscoe has brought forward "conclusive evidence" of the fact; but from its being denounced as incredible in most of our standard works which have occasion to treat of the subject, such as those of Taylor and Pereira, and from its having been strongly denied in some important criminal trials, as by Dr. Christison in the case of Wooler ('Edinburgh Monthly Journal') 1855-56, pp. 709, 710), whilst Roscoe's valuable paper appears not to be sufficiently known, it seems to me the general belief in this country that there is no foundation in fact for the alleged arsenic-eating in Styria.

What seemed to result from the inquiries of Von Tschudi, Knappe, and Heisch, was this:—

I. That in various parts of Styria and the adjoining countries certain individuals were in the habit of swallowing daily, or twice or thrice a week, or at longer intervals, a certain quantity of a mineral substance, called "Hüttereich," * for various purposes, such as the improvement of the appearance, the rendering more easy the respiration during mountain climbing, as a condiment, as a tonic and stimulant, as a prophylactic against disease, and as a preservative of health; and that this so-called Hüttereich was arsenic.

II. That these individuals became, through custom, capable of taking doses of arsenic varying from one grain to several grains daily.

III. That its more immediate effect on the system was to make them lively, combative, and of strong sexual desire. This latter physiological effect may perhaps be held to be indirectly proved by the inordinate number of illegitimate children in some of these places, the proportion sometimes rising nearly as high as 60 per cent. of the total births.

Against all this was to be placed—

I. The experience of medical men in other countries, who have found that by the continued use of arsenic as a drug, even in fractional parts of a grain, certain consequences arose directly contrary to those experienced by the partakers of it in Styria.

II. The want of proof by analysis that the substance said to be taken was really arsenic; the absence of any chemical examination of the excretions of an arsenic-eater, so as to prove that arsenic really had been swallowed; the want of any accounts of its effects when first begun to be used, or of any information as to the origin of the custom.

Most of these objections, however, have been removed by the investigations of Drs. Knappe and Heisch, to the former of whom I am indebted for much interesting information on the subject.

It is not at all surprising that in other countries there should be a prevalent impression of the non-existence of this practice in Styria, seeing that in Austria itself, those who have not made special inquiries on the subject are generally sceptical as to it. Any one, therefore, passing through Austria and making casual inquiries, would most likely be told that the practice of arsenic-eating was not generally known or believed in. It is not difficult to account for this. The people who eat arsenic have the idea that it is regarded as a bad habit, and therefore one to be concealed as much as possible, just like opium-eating in this country; and they have the additional reason for

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* I use the spelling adopted by Dr. Machar in his 'Medizinisch-statistische Topografie Steiermarks.' Although the pronunciation of the Styrians makes it Hütrach, it is obvious that the word really is Hütten-rauch—literally, furnace-smoke or vapour.

concealing the practice, that from the strictness of the laws regarding the sale of poisons, they cannot get the arsenic by open purchase, as the opium-eater in this country can get his laudanum, and therefore they are generally obliged to purchase it from illicit dealers.

I now proceed to narrate what I have myself ascertained by personal observation. Though without an introduction to him, I called on the Medicinalrath, Dr. Von Vest, who on learning the object of my visit, with great courtesy put at my command any papers that his office contained, and in addition, supplied me with introductions to Drs. Knappe, Machar, and Tingler, the two former of whom I was fortunate enough to see, but I was unable to spare time to see Dr. Tingler.

Dr. Machar, now resident at Stainz, who is thoroughly acquainted with all the medical matters of Styria, and whose experience during a long period of active professional work there makes his opinion of no small value, informed me that, although cognizant of the existence of the practice, he had little personal experience in the matter. He related to me, however, one case in which a woman who had been tried for poisoning her husband with arsenic, had been acquitted, from "want of evidence," the plea for the defence being that the man had been an arsenic-eater. Though this defence was generally believed to be false, it shows at all events that the practice has, in a court of justice, been admitted to exist, and has served in at least one instance as a successful ground of defence.

Dr. Knappe, of Liegist, in Middle Styria, an hour's journey from Gratz, was my next informant; and when I first spoke with him of the case of J. W., already alluded to as the subject of experiment, and whose urine had been examined by Dr. Schäfer, he described him as a small strongly-built man, with a great muscular development, a wood-cutter by trade, who had taken the drug for a period of twelve years. Dr. Knappe further stated to me that, while personally ignorant of the actual existence of an arsenic-eater in the neighbourhood, he could go with me to Upper Styria, and show me the above man; but he suggested that we should first make inquiry in the village, whether or not any of those persons described to him as indulging in the habit could not be got to take a portion of it before me. I accordingly slept in Liegist that night, and next morning I had the satisfaction, in presence of Dr. Knappe and my companion Dr. Rutter, of having my first interview with an arsenic-eater.

Case 1.—Mathias Schober, a healthy-looking, fresh complexioned, fairly muscular young man, of the age of twenty-six years, and about five feet nine inches in height, a native of Liegist, and employed as a house servant there, said he had taken Hüttereich for about a year and a half,—not however, white arsenic, but the yellow arsenic, or orpiment, of which he took a specimen from his pocket and showed it to me. Of this I retained a piece for chemical investigation. He informed me that he took the arsenic in order to keep strong, though he had never suffered from ill-health. He said he had never experienced any bad effects even when he first began using it, that he had at first taken rather less than a grain every fortnight, that he now took it twice a week, and that on omitting to take it for any longer period he experienced a longing for it, which was relieved by a repetition of the usual dose. His reason for taking the orpiment instead of the white arsenic was, that it was more easily procured; but having professed himself quite indifferent whether it were arsenious acid or the sulphuret, Dr. Knappe produced a paper containing the former (of which I also kept a sample), and having asked him to choose out a piece such as he was in the habit of taking, it was weighed and found to be nearly five grains; we had no finer weight than one grain, but the piece of arsenic was much over four, though less than five. Dr. Knappe having carefully ground this to powder on a clean piece of paper, it was transferred to a small piece of plain white bread, about as large as a man's thumb-nail, and this the doctor put into his mouth; Schober chewed it and swallowed it, and then swallowed another portion of bread the same size immediately after. This was at 9.30 A.M. He stayed with us a few minutes, but he had to reurn to his work, promising however to come back in a short while. This he did at 11.30, two hours after, and made water in my presence to the amount of what I estimated at twenty-eight ounces, into a vessel previously carefully cleaned, and the urine was put into bottles thoroughly washed by myself. Unfortunately, in the hurry of my departure, in trying to pack these bottles into my hat-box, I broke one, and thus lost part of the urine. Since my arrival in this country I subjected the contents of the two remaining bottles to chemical analysis, adopting the distillation process of Dr. Taylor as the most convenient way of separating arsenic from the organic matters of the urine. For this purpose the urine was carefully evaporated to dryness in a clean retort; the nearly dry residue was covered with strong hydrochloric acid, and distilled into a well-cooled receiver. The product, amounting to about half an ounce, was a clear, feebly pinkish fluid, thirty minims of which, when treated both by Reinsch's and Marsh's process, gave very characteristic arsenical deposits.

Schober also came the following day to see me, having taken no more arsenic since the dose which he had swallowed before me twenty-six hours previously. I again secured some urine which he passed in my presence, and this, when chemically examined as above, also yielded arsenic freely.

Case 2.—Joseph Flecker, æt. 46, a muscular, healthy-looking, clear complexioned man, a tailor by occupation, told us that he had taken Hüttereich (generally the orpiment) for a period of fifteen years. He first began to do so on the occasion of the inhabitants of a house in the neighbourhood where he lived being attacked with fever; and when fourteen people had died in it, and no one would enter the premises, he determined to do so, and took, as a prophylactic, about one grain of arsenic daily for three successive days, while going to the infected house, and though he said he had not felt quite well at the time, he was unable now to describe specially what had ailed him; but on being asked if he had ever suffered from vomiting or irritation in the stomach, he said he had not.

The day before my interview with him he twice, viz. at 10.30 and 3 o'clock, had—in the presence of several of the villagers of Liegist, and on one of those occasions in presence of the bürgermeister, who informed me that he had seen him do it—taken a piece of the sulphuret of arsenic from his pocket, and scraped off a certain quantity of it on a piece of bread and eaten it. He brought with him a small bottle of his urine, which he stated to have been passed eighteen hours after the last of the two doses, and in which I have since found a considerable quantity of arsenic. The reason which he assigned for this public exhibition of his arsenic-eating capacities was, that it became the subject of conversation in the village that two strangers had come a very considerable distance to witness an example of arsenic-eating and inquire into the practice, and that he wished to make an open demonstration of his assertion that he was capable of tolerating a considerable dose of arsenic. When he first came to me he seemed somewhat unwilling to take a dose that day, owing to his previous performance, and seemed to fancy it possible that he might have some slight irritation of the stomach, such as a feeling of warmth accompanied by thirst. He did not appear to be able to give any reason for anticipating this result; perhaps he intended it as a gentle hint that the thirst might require assuaging; at all events, having been informed that he should not want the wherewithal to quench it (he confessed to being by no means abstemious in the matter of alcoholic potations), he, to satisfy our curiosity, picked out a piece of arsenious acid from the same parcel that had been shown to Schober, and which, on being weighed, was found to be as nearly as possible six grains. This he placed entire on a small piece of bread, and taking it into his mouth, crunched it up audibly, and in about two minutes after swallowed six or seven ounces of cold water, stating that he liked to drink immediately after swallowing a dose, and on such occasions preferred water. I then made him open his mouth and inspected it narrowly, but found it quite clear of bread crumbs or anything else, thus assuring myself that no jugglery could have been practised. After having swallowed the arsenic four minutes he eructated slightly, but till he left us, a quarter of an hour after, he had no symptoms of any bad effect. The six grains were taken at 11.30, and at 12.15 he returned, and passed a small quantity of light-coloured urine. Nearly the whole of this was bottled for exportation, and the twelve ounces thus secured were treated by the process of distillation above described, and also yielded a characteristic deposit of arsenic.

Flecker gave me the following account of his use of arsenic. He stated that he generally takes about the quantity we saw him swallow once a week, but with variations in the intervals, there being sometimes four days only, sometimes eight days between the doses. That when he has a distance to walk to his work, he takes a larger dose, and is then in good spirits for about eight days. That if he, however, intermits it for fourteen days he feels stiff in the feet, with general lassitude and a craving for another dose. If his victuals are hard of digestion, he takes a dose to assist the stomach, and if he takes a rather full dose he brings a good deal of wind off his stomach, but never vomits. He stated that his father had taken arsenic before him, and in considerable quantity, and that in the immediate neighbourhood of Liegist numbers use it, several taking it daily, and many in larger doses than he. He said that all who take it are healthy; that he never knew of any one vomiting from its use, and he believed that, like the use of tobacco, if the dose is very gradually diminished, an arsenic-eater can break himself of the habit.

One of the objections which has been made to the acknowledgment of the reality of arsenic-eating is, that the substance swallowed has not been ascertained by chemical examination really to be arsenic. This link in the chain of evidence I am able to supply. The white substance which I saw Schober and Flecker swallow, part of which I have now in my possession, is pure arsenious acid. It sublimes into octahedral crystals, and leaves no appreciable residue. The yellow substance which Schober used is a fair sample of the orpiment of commerce, and contains, as that substance usually does, a considerable portion of free arsenious acid.

I am of course not in a position to give any opinion as to the extent to which arsenic-eating prevails in Styria,—my time would not have permitted me to enter upon such an inquiry, nor would it be easy to get satisfactory information as to a practice which is generally kept secret; confirmation of the fact of its existence is more interesting to us scientifically than its extent; and that it is a fact, my personal observation enables me confidently to affirm. That arsenic-eating in Styria is a universal habit, or one indulged in by even a majority of the male peasantry, I do not for a moment suppose; but the averment "that the story of the Styrian arsenic-eaters is not only unsupported by adequate testimony, but isinconsistent, improbable, and utterly incredible" (Kesteven, Assoc. Med. Journal, 1856, p. 811); or that these are "absurd and exaggerated statements, utterly inconsistent with all that is known concerning the action of arsenic in this or other countries, and but for the fact that they for a time received the literary support of Professor Johnston, and were diffused by him in an amusing book, they would not have required any serious refutation" (Taylor, 'On Poisons,' 2nd ed., p. 92); or that it is a "mass of absurdity," "a pure fable" (Christison, Edin. Med. Journal, 1855-56, pp. 709, 710)—are, although justified by the state of knowledge at the time they were made, no longer tenable; but on the contrary, we can no longer doubt, to use nearly the words of Roscoe, "that decisive evidence has been brought forward, not only to prove that arsenic is well known and widely distributed in Styria, but that it is likewise regularly eaten in quantities usually considered sufficient to cause immediate death."

It is probable that many of the physiological actions attributed to it are fanciful, and that its use is mixed up with a good deal of superstition, as for example, in the case of the poacher who takes it to give him courage to pursue his depredations on ground that is new to him; or that of the ostler, who in giving it to his horses to improve their coats, thinks that it will have no beneficial effect unless he partakes of it at the same time.

It is evident that the confirmation of the existence of the practice of arsenic-eating must lead us to modify some of the opinions that are entertained with regard to the influence of habit on the action of poisons. It has long been notorious, that by habit, the human body may be brought to bear with impunity, doses of organic poisons, such as opium, which, to those unaccustomed to them, would certainly prove fatal; but "it has hitherto been considered by toxicologists that, except within very narrow limits, habit appears to exercise no influence on the action of mineral poisons" (Taylor, 'On Poisons,' p. 89). Though the experiment of M. Flandin, by which he proved that he could bring dogs to bear fifteen grains of arsenious acid in powder in twenty-four hours, without injury to their appetite or health, and the practice of administering arsenic to horses, have long been known as pointing rather in the contrary direction,—this has been supposed to be due to some peculiarity in the constitution of the lower animals. The facts which have been ascertained with regard to the Styrian arsenic-eaters, and which the above observations confirm, entitle us to maintain that the modifying effect of habit is not confined to organic poisons, but extends to those of mineral nature, at all events to arsenic.—*Edinburgh Medical Journal.*

BOOKS RECEIVED.

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Thomson's Conspectus of the British Pharmacopœia. Edited by Edmund Lloyd Birkett, M.D., etc. New edition. London: Longman, Green, Longman, Roberts, and Green. 1865. (From the Publishers.)

Nitrogen shown to be Carbonic Oxide in an Allotropic State. By Henry Kilgour. London: John Churchill and Sons. (Pamphlet.)

TO CORRESPONDENTS.

Persons having seceded from the Society may be restored to their former status on payment of arrears of subscription and the registration fee for the current year.

Those who were Associates before the 1st of July, 1842, are privileged (as Founders of the Society) to become Members without examination.

We beg to thank Mr. Thonger for his communications. As the label referred to has already been fully described in this Journal, we are unable to publish the correspondence on the subject.

J. C. W. (York).—Bentham's 'Handbook of the British Flora' and Bentley's 'Manual of Botany' are distinct works, as may be seen by their titles, etc.

Apprentice (Manchester).—Bentley's 'Manual of Botany' is published by Churchill and Sons, price 12*s*. 6*d*.

Inquirer (Nottingham).—Will be published, we are informed, some time in June.

R. A. P. (Bristol).—The lectures at the Royal Botanic Gardens will commence, as may be seen by the notice on the inside of the cover, on Friday, May 19th.

J. J., P. C.—The *Patent Medicine Stamp Act* applies to medicines intended for the human subject only.

"*Chemicus*" (Carlisle).—Those chemists only whose names are on the Register as Pharmaceutical Chemists can claim exemption from service on juries.

"*Surrey*."—*Benzoated Zinc Ointment.* See vol. xiv. p. 207.

"*An Apprentice*" (Liverpool) sends us a sample of *Unguentum Hydrargyri Nitratis*, and is surprised that any difficulty should be experienced in making the ointment, if the instructions of the Pharmacopœia are followed; and suggests that the quality of the lard used in the process may be the cause of failure.

Mr. Mumbray (Richmond) and "*An Apprentice*" (York) are thanked for their communications.

Erratum.—Page 534, line 19, and page 535, lines 7 and 18, *for* "treated" *read* "heated."

Instructions from Members and Associates respecting the transmission of the Journal before the 25th of the month, to Elias Bremridge, Secretary, 17, Bloomsbury Square, W.C.

Advertisements (not later than the 23rd) to Messrs. Churchill, New Burlington Street. Other communications to the Editors, 17, Bloomsbury Square.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VI.—No. XII.—JUNE 1st, 1865.

THE PROGRESS OF LEGISLATION RESPECTING PHARMACY.

Our readers will doubtless expect some information as to the present position of the Chemists and Druggists' Bills now before Parliament, but we have nothing very definite to offer, owing partly to the multiplicity of questions addressed to each witness before the Select Committee of the House of Commons, and partly to the adjournment of the Committee from Thursday the 18th to Thursday the 25th ult., and again the postponement to the 1st inst., making in all a loss of a fortnight. This is indeed a most important delay, and we shall not be surprised if the session close, the Parliament go out in fact, without completing our work.

At the first sitting of the Committee, Dr. Alfred Swaine Taylor was examined at great length; Mr. Simon more briefly. The evidence of both was strongly in favour of legislation; the former gentleman perhaps dwelt more particularly on the necessity for restrictions on the sale of poisons than the dispensing of medicines under the authority of prescriptions; but both spoke confidently as to the propriety of entrusting whatever examination might be instituted to the hands of the Pharmaceutical Society.

On the second day Dr. Quain, in an examination of three hours' duration, never wavered or failed to express most clearly his opinion, however tortuous and apparently irrelevant the questions put to him might be, that what is called "free-trade" in physic implies danger to the public. Dr. Wilson followed, and was equally strong in the same conviction. Mr. Mackay, of Edinburgh, closed the day, and had been only "*part heard*" when the Committee broke up.

On the third day the Committee consulted, with closed doors, for more than two hours, and then called Mr. Mackay; on the completion of his examination the room was again cleared, and when reopened the Chairman read the following resolutions as having been agreed to:—

1. That no compulsory examination or registration under the Bills referred to the Committee should be required of persons now carrying on the trade of chemists and druggists.

2. That the Bills do provide that no other person shall, after a day to be fixed by the Bill, sell certain dangerous drugs to be scheduled in the Bill, unless he shall be examined and registered.

3. That the Committee do proceed on this day week with Chemists and Druggists' (No. 2) Bill.

This then is the present position of the whole affair. The registration of men in business at the time of the passing of the Act, which had been made compulsory in both Bills, is struck out. Its insertion in Sir Fitzroy Kelly's Bill had been made for two reasons ; first, that all members of the trade might be brought together ; secondly, that their vested interests might be more perfectly preserved, and even augmented by a permanent record. Under the new arrangement chemists and druggists now in business would be left, as the apothecaries were in 1815, to work on without any interference.

It may be that a voluntary registration would be instituted ; but that does not appear at present. There is no *principle* lost in this resolution, and it affects both Bills alike.

The second resolution is of more consequence, and that from what it omits rather than what it contains. There can be no doubt that dangerous drugs should be sold only by qualified persons, but to put the sale forward as more important than dispensing them in compounds is a vast mistake, and one which, in the interest of the public, we hope will be rectified before any new Bill resulting from the inquiry of this Committee be launched in the House. If a man require a poison in its simple form he may be expected, of his own judgment, to know enough of its nature to ascertain whether he be rightly or wrongly supplied. Not so with regard to mixed medicines.

For the rest all is for the moment uncertain. We know the opinion of Government, as expressed by Sir George Grey, on the second reading of the Bills, as to the examining board which should be entrusted to carry out what may be enacted ; that opinion seems to be shared by the whole House of Commons, and strengthened as it must have been by all the evidence of the medical officers of the State and the independent medical witnesses, we feel no fear as to the result ; but the proceedings of the Select Committee on these Bills have not been such as to inspire much confidence in the future. If the resolutions already passed be adhered to, any measure that may be framed in accordance with them will but imperfectly accomplish the objects contemplated by the originators of the existing Bills, and it is quite possible that further resolutions may convert what was a beneficial measure into one of an undesirable character. The subject is at present in a critical position, and requires more than ever that every step should be carefully watched by the Council, and that our members throughout the country should be prepared for prompt and energetic action in case of need. We cannot say that it would be impossible now to frame, upon the resolutions of the Committee, such a Bill as we should be prepared to accept ; but there is some ground for apprehension that an attempt may be made to substitute for a really good and comprehensive measure, one the effect of which would be to impose unnecessary and objectionable restrictions on trade, and, by recognizing and establishing an imperfect and insufficient qualification for dealers in and dispensers of medicine, to discourage rather than promote the advancement of the art and science of pharmacy. The Pharmaceutical Society, who, for nearly a quarter of a century, have upheld the standard of pharmaceutical qualification, and have stood alone as the promoters and supporters of pharmaceutical education, have a heavy responsibility resting upon them. At the suggestion of the Medical Council they have endeavoured to give extension to the operation of the principles which, as a voluntary association, they have hitherto advocated and applied ; but rather than sacrifice these principles, they should be ready to fall back upon their existing position, and to rest satisfied for the present with the privileges they possess, and the confidence they have acquired from the whole of the medical profession and a large proportion of the general public.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

SPECIAL MEETING OF THE COUNCIL, *March 27th*, 1865,

Present—Messrs. Bird, Bottle, Evans, Hanbury, Haselden, Hills, Morson, Orridge, Sandford, Savage, Standring, Watts, and Waugh.

AT A MEETING OF THE COUNCIL, *May 3rd*, 1865,

Present—Messrs. Bird, Deane, George Edwards, J. B. Edwards, Hanbury, Haselden, Hills, Morson, Orridge, Sandford, Savage, Squire, Standring, and Waugh,—

The following were elected

MEMBERS.

Cambridge	Edwin Bing.
Codnor	Thomas Farnsworth.
Durham	William Sarsfield.
Hawthorn, Victoria	Robert Appleton.
Kaffraria	Thomas Daines.
Leicester	Alfred Berridge.
London	John Cahill Hyslop.
New Brighton	William Jarvis.
Newtown, Montgomery	Richard Morgan.
Preston	William Hogarth.
Ramsgate	Henry Sawyer.
Stockport	John Yeoman.

MEETING OF COUNCIL, *May 17th*, 1865.

Present—Messrs. Bird, Bottle, Deane, George Edwards, J. B. Edwards, Evans, Hanbury, Haselden, Hills, Mackay, Morson, Orridge, Sandford, Savage, Watts, and Waugh,

To arrange the business for the General Annual Meeting.

EXAMINATION, *May 10th*, 1865.

MAJOR.

Davies, Moses Prosser	Newcastle Emlyn.
Hudson, John William	Bradford, Yorkshire.

MINOR.

Chubb, Osborn	Taunton.
Jelley, Stephen John	Hull.
Kirkman, Charles John	Horndean.
Selfe, William Gilbert	London.
Starkey, Ebenezer Benjamin	London.
Watson, James	Mauritius.

REGISTERED APPRENTICES.

Name.	Residing with	Address.
Took, William John	Mr. Gowland	London.
King, Abraham	Mr. Stroud	Bristol.
Hills, Walter	Mr. Gibbs	Ryde, I. W.

EXAMINATION, EDINBURGH, *May 10th*, 1865.

MAJOR.

Cameron, William	Edinburgh.
Morris, Thomas E.	New Brighton.

REGISTERED APPRENTICE.

Lindsay, Robert	Mr. Macdonald	Lasswade, N.B.

CONVERSAZIONE.

The usual annual Conversazione was held in the Society's rooms on Tuesday, the 16th of May, and the invitations which had been issued by the President, the Vice-President, and Council were responded to by an unusually large number of visitors. A great variety of most interesting objects were provided by the kind assistance of friends, many of whom have on former occasions contributed in a similar manner. On the walls of the principal rooms were several valuable pictures and prints, lent by Messrs. Hills, Bird, and Vokins, but the greatest space was occupied by a large collection of most beautiful specimens of dried ferns and seaweeds, arranged and contributed by Mr. Jardine. Some handsome busts were contributed by Mr. Butler, some bronzes by Messrs. Jackson and Graham; a lectern, on which were exhibited some photographs enlarged from "cartes de visite," by the London Stereoscopic and Photographic Company; literary antiquities by Mr. Campkin; and a collection of rough sketches from nature, made by the late Mr. Gendall, of Exeter, by Mr. Bremridge.

Several fine buffalo and other heads and some antlers, a pair of which were immovably locked together by the animals while fighting, were lent by Mr. Leadbeater; some valuable minerals and fossils by Mr. Gregory, and a collection of minerals by Mr. Wright; models of crystals by Mr. Larkin; various sizes of Thompson's patent universal air-tight stopper for bottles and jars, by Mr. P. Graham; a variety of articles in ebonite by Messrs. Silver and Company; model of an aërial machine, invented by Mr. Quartermain, by Mr. Martin; patent flexible diaphragm, for the preservation of liquids liable to be injured by exposure to the atmosphere, and patent elastic valve, by Mr. L. Bourne; pharmaceutical apparatus by Messrs. Maw and Son; specimens of glass by Messrs. Phillips; specimens of Russian hardstone manufacture from Siberia by Messrs. Phillips Brothers; microscopes by Mr. Ross; improved ophthalmoscope and microscopes by Messrs. Smith and Beck; the asteroscope, stereoscopes, microscopes, and new photographic manipulating apparatus by Messrs. Murray and Heath; a new aneroid barometer, showing a movement of three feet to one inch of the mercurial barometer, the Herschel-Browning spectroscope arranged for observing the spectra of the stars, star spectroscopes as used by Huggins, large model spectroscope with eight prisms, five-guinea spectroscopes, micrometric apparatus in aluminum, etc., by Mr. John Browning, of the Strand; Berthon's improved telescope stand, and apparatus for polarized light by Messrs. Horne, Thornthwaite, and Company; barometers, etc., by Mr. Casella; electro-magnetic engine in motion, and other philosophical apparatus by Mr. How; oil-lamp furnace by Mr. Griffin; cube of glass, perforated by the spark from an induction coil, by Mr. Gassiot; and simple needle telegraph by Mr. T. Boverton Redwood. A large collection of valuable specimens (some most beautifully crystallized), illustrating the manufacture of aniline dyes, including a set of products, with their proportions, from the common coal yielding the tar to the solid dye, also specimens of silks dyed of various colours, were contributed by Messrs. Simpson, Maule, and Nicholson. These specimens were illuminated by the magnesium light by Mr. Solomon, the co-inventor of Solomon and Grant's patent magnesium lamp. Specimens of pure crystallized carbolic and picric acids, dyeing materials obtained from this source, and dyed silk illustrating the colours produced, by Messrs. Crace Calvert and Co.; specimens illustrating the manufacture of iodine and other products from seaweed, by Stanford's process, as carried out by the British Seaweed Company (Limited), by Mr. E. C. C. Stanford; ancient chemical apparatus, peroxide of barium, peroxide of hydrogen, "oxygennesis," etc. by Mr. Robbins. Some specimens of new organic compounds containing iodine, details of the preparation and analysis of which were given at a recent meeting of the Chemical Society, by Mr. W. A. Tilden. In this collection is a fresh example of an artificial tourmaline produced by the action of iodine upon an organic base, the first instance of a similarly constituted body exhibiting this remarkable action upon light having been discovered by Dr. Herapath, and well known as iodo-sulphate of quinine.

The new crystals are obtained from caffeine or theine, the alkaloid which constitutes the active principle of tea and coffee, and are analogous in composition to Herapath's salt, but differ from it in containing hydriodic in place of sulphuric acid, their chemical formula being represented thus—$C_{16}H_{10}N_4O_4, HI, I_2$, with sometimes six and sometimes two atoms of water of crystallization.

The other specimens consist of substances perfectly similar in constitution, but containing ethyl and methyl in place of hydrogen, to the formation of which the author of this investigation was led in the pursuit of experiments upon the internal constitution of bodies of this class. The identity of construction of the new caffeine derivatives is easily seen by reference to the formulæ written below:

$$C_{16}H_{10}N_4O_4, HI, I_2$$
$$C_{16}H_{10}N_4O_4, C_2H_3I, I_2$$
$$C_{16}H_{10}N_4O_4, C_4H_5I, I_2$$

A similar compound from strychnine has also been prepared in addition to the one already known.

Messrs. Johnson and Matthey contributed a large platinum still of about 100 gallons capacity, and of the value of £2000, such as is used in the manufacture of oil of vitriol; model of ingot of pure platinum, weighing 266½ pounds, and of the value of £3840; fine specimens of pure distilled magnesium, a platinum pyrometer, small platinum still, specimens of gold and its compounds, etc. etc.; the same gentlemen also exhibited the magnesium light on a large scale during the evening.

Dr. Maddox's micro-photographs, manufactured by Mr. How, were exhibited on the screen by Mr. Jones; and a model of a fish ladder, invented by Mr. Smith, of Deanston, and lent by Mr. Ffennell, was in operation, the little fish appearing to like the exercise. This contrivance is for the purpose of enabling fish to pass mill-dams without causing much loss of water to the miller, and is practically in use in Great Britain, Canada, and elsewhere.

In one of the principal rooms was a large collection of medical and economic plants from the Royal Botanic Society's Gardens, Regent's Park; and some amulets or charms, prescribed and sanctioned in days gone by by the faculty of our own land, and still in vogue in the Celestial Empire and elsewhere, from Mr. Daniel Hanbury.

A model of Adams's radial axle for locomotives and railway carriages, enabling the wheels to adapt themselves to curves in the permanent way, was contributed by Mr. Davenport; and a patented still for the continuous fractional distillation of petroleum, etc., and a variety of pharmaceutical steam and other apparatus, by Mr. Coffey.

An improved dispensing counter, designed by Mr. Joseph Ince, 26, St. George's Place, Hyde Park Corner, and manufactured by George Treble and Son, Gloucester Street, Hoxton, attracted considerable attention; the proportions for a perfect counter have been calculated for two compartments, each three feet three inches. In this arrangement the dispensing bottles are placed in the centre between the two assistants; the space thus gained relieves the crowding of the sides; the right (head dispenser's) side has then twice the room allowed for measures, pigeon holes, etc., together with a row of three dispensing extracts and three pill-masses, viz.

1. Ext. Hyoscyami.	1. Pil. Rhei Comp.
2. Ext. Conii.	2. Pil. Hydrarg. c. Coloc.
3. Ext. Coloc. Comp.	3. Pil. Ferri Comp.

The left side to be filled up with infusion jars for the junior dispenser; the *large* dispensing stock bottles in the drawers not to be repeated, but the sizes varied, so that every requisite bottle may be at hand.

Carré and Company's ammonia ice-making machine, lent by the agent, Mr. Sheppard, of Leadenhall Street, was in operation during the evening, and by means of it some ice creams were made, so that the visitors had an opportunity of practically testing the quality of the ice produced. This apparatus, the action of which depends upon the fact that intense cold is produced by the volatilization of ammoniacal gas, consists of two vessels made of iron and hermetically closed, which may be compared to a retort and receiver; the retort or boiler, having been previously half filled with the strongest liquor ammoniæ, is heated by a charcoal fire or other source of heat, the receiver being cooled by immersion in cold water; under these circumstances the ammonia volatilizes under pressure and condenses in the receiver. When the process has been continued for a length of time varying from forty-five minutes to one hour and twenty-five minutes, according to the size of the machine, the boiler is withdrawn from the fire and the receiver from the water, the former is immersed in cold water, while the latter is clothed in a flannel jacket, and is exposed to the atmosphere, and the water or mixture to be frozen or cooled, having been placed in a tin vessel, is dropped into a cavity provided in the centre of the receiver. After the lapse of about the same time as was required for the heating process, the tin cylinder within the receiver may be withdrawn, when, if water was previously introduced, a block of ice will be found (varying in weight from one to four pounds, according to size of apparatus). The ammonia, of course, is never wasted, being merely distilled from one vessel to the other, and the expense is therefore very trifling.

Mr. George Lansdown exhibited a model illustrating his patented method of communicating between passengers and guards in railway trains. The object of this patent is to introduce in the construction and arrangements of railway carriages a continuous thoroughfare or way along a train, by the aid of adjustable open or enclosed platforms or footways, which shall bridge across the space between any two adjoining carriages, leaving free play for the buffers. The proposed thoroughfare or way may be either along the interior or exterior, depending upon the width of each carriage. The patentee states that the advantages of the proposed method of communication are:—1. That it will secure the perfect supervision of the whole interior of the train by the guard or attendant in charge of the same. 2. That it will combine the convenience and seclusion of the English system of railway carriages, with the advantages and protection of the American system. 3. That the present railway carriages can be altered in accordance with this patent without any very great expenditure, and the new carriages, it is believed, can be constructed without any additional cost. 4. That the existing carriages can be gradually replaced by either new or altered ones, and thus prevent the necessity of any immediate great change in the present system of carriages.

Messrs. E. B. Bernard and Co. showed in action a working model of their Railway Passengers' Safety Signal; they state that the advantages this signal possesses are its simplicity of action, and the instant assistance that can be obtained from the travellers in the adjoining compartment, rendering it unnecessary to stop the train, until its arrival at the next station, when the porter, seeing the signal exhibited, would prevent any person leaving that compartment until satisfied as to the cause of its being used, thus rendering detection certain. When the signal is exhibited the bell may be rung until assistance is given.

For short distances between stations nothing further will be required, so that carriages may be added to, or taken from the train without delay. For long distances, an electric wire fixed underneath the carriages, and joined by the coupling chains, can be used to ring a bell in the guard's brake, the contact being completed by the "disc" of the signal going out. One pull of the handle opens the communication with the adjoining compartment, exhibits the "disc" and rings the bell in the carriage, and also in the guard's brake.

Lenoir's patent prize-medal gas engine, of half-horse power (from the London depôt, Cranbourn Street, Leicester Square), was at work during the evening. The motive power in this engine is a mixture of one part of coal-gas and eleven parts of air, which is exploded by the spark from an induction coil. It is in appearance very much like a horizontal steam-engine, having a cylinder, piston, crank-shaft, and fly-wheel; the cylinder has the necessary slide arrangements for the admission of coal gas and atmospheric air in due proportions, which at the proper moment is ignited by the electric spark—the connection being made and detached by the rotary action of the crank shaft—the expansive force, consequent on the ignition, gives motion to the piston on each side alternately. The cylinder has a water jacket surrounding it, through which a stream of hot or cold water is kept gradually flowing, to absorb any excess of heat. It is found that its consumption of gas is about 70 feet per horse power per hour of actual work, giving a cost, with gas at 4*s.* 6*d.* per 1000 feet, of about 4*d.*, and no better practical proof of its safety can be offered than the following, viz. that Lenoir's gas engine was the only prime mover permitted by the Commissioners of the International Exhibition, 1862, to generate its own power within the building.

At intervals during the evening the lecture theatre was crowded to witness the exhibition of Mr. Stewart Harrison's self-acting preserver valve for the extinguishing of fires. This consists of a peculiarly-constructed water-valve, which is kept closed by a ring of fusible metal. We will suppose that a warehouse has a number of these valves fixed in different parts of the ceiling; a fire breaks out in the goods piled up upon the floor, and the heat ascending impinges on the valve in that part of the ceiling which is over the ignited goods; when the valve acquires a temperature of about 212° F. the fusible metal melts, the valve is opened, and a stream of water is poured down upon the precise spot where the fire originated, while the passage of the water causes the ringing of an alarm bell, and completes an electric circuit which may be made to ring another bell at any distance off, say, at the residence of the superintendent of the warehouse. For purposes of demonstration the inventor used a model house in which a fire of shavings was lighted; in less than a minute from the time of applying the light, the valve was opened, the water poured down, the fire extinguished, and two alarm bells set ringing, one on the top of the house, and the other at some distance from it.

THE TWENTY-FOURTH ANNIVERSARY MEETING OF THE PHARMACEUTICAL SOCIETY.

Wednesday, May 17th, 1865.

MR. G. W. SANDFORD, PRESIDENT, IN THE CHAIR.

The President opened the Meeting with the following Address:—

Gentlemen,—It was the will of the Council to which you entrusted the affairs of our Society last year that I should again occupy the President's chair. The period has been critical, big with the fate of Pharmacy, and the duties of my office have necessarily been onerous; but the labour of fulfilling them has been lightened by the privilege they afforded of working in a good cause, and the pleasure of again meeting you here is a reward and encouragement. I say an encouragement, because I believe you come actuated, as I have been, by a desire to promote the great objects of our institution. The advancement of pharmaceutists in Great Britain to their legitimate position has occupied us all more or less for nearly a quarter of a century; and if at times we have worked under discouragement, or at least with no very definite prospect of success, and still have not wavered in our course, I feel assured that under present circumstances we shall not flag. These anniversaries are, as it were, halting-stations on our road; not stations at which we are to rest, but opportunities for refreshing each other on the journey,—high ground from which we look back to difficulties surmounted, and forward to still higher ground yet to be attained. And, gentlemen, there have been difficulties in our path. There was on the surface so little interest in common amongst chemists and druggists at the commencement of our Association, that the very men of whom it was necessary to form it seemed to be discordant elements; but beneath the surface, under the petty jealousies which druggists were supposed to harbour more than other men of one calling towards each other, despite the conviction of each individual that he best understood his own business, there was an interest, latent it might be but capable of development as time has proved, strong enough to hold us together. I mean the interest we all have in the education of pharmaceutists. Year by year, our success in making this interest manifest has increased; year by year, in proportion, those petty trade jealousies which were one of our difficulties have decreased, and we meet here in honest and hearty fellowship to promote our common cause. But, gentlemen, our common cause is the common cause of the public; and now that we are united in recognizing it ourselves, we are able to obtain recognition for it from others. When we met here last year, we were commencing an effort to obtain legislative enactments rendering examination compulsory on all future dispensers; the prosecution of that object has been the chief work of the year, and I hope its completion is at hand. The Select Committee of the House of Commons has spent two days in hearing evidence on the subject; on the first, the preamble of our Bill was proved, *that the safety of the public does require an educational qualification in our body.* At the second sitting, *the form in which legislative enactments should be cast* occupied the Committee. It would be manifestly unsafe for me under these circumstances to attempt to foreshadow the ultimate decision; but this much I may say, that the testimony of every witness who has appeared before the Committee up to this time—and they have included Dr. Swaine Taylor, Mr. Simon, Dr. Quain, and Dr. Wilson—has been abundantly in favour of the Pharmaceutical Society, and I feel that whether our Bill be carried through this Session or not, our Society must be a gainer by the discussion which brings it so prominently before the Legislature and the public. Gentlemen, it is for us to uphold the character which we have received from these witnesses. I say to uphold it, but in that I would not be misunderstood: I mean, to maintain it so clearly, so unequivocally, by our individual course—and it is here that we must acknowledge our duty to the Society as individuals—as to confirm that testimony. I would not counsel you to hold your privileges in a narrow and illiberal spirit. Much has been said during our discussions on legislation about the equality of Pharmaceutical Chemists who entered this Society in its commencement without examination, and those who being in a position to do so, from some reason or other, thought fit to stand aloof. It would be easy to set up a claim of superiority on the mere fact of the instant acknowledgment of the necessity for education and the active assistance to promote it; we might establish it, too, or rather consider that it is established by the anxiety of the outsiders, as they are now called, to come in and share our honours and our privileges. But I would not scan too closely the motives for standing aloof which may have actuated many good men in our trade; the Society was then, and is now, but a voluntary one; the "*cui bono?*" question might not be so easily answered before Pharmaceutical Chemists were declared necessary for the Government services, were recognized and consulted by the higher medical authorities, and were exempted from jury service; nevertheless, I say, although these men have not shared with us the heat and burden of the day, I think, for the sake of bringing all into union, and securing a compulsory examination hereafter for dispensers, it would be wise in us to receive them liberally. There is the one title granted by Parliament to what I may call the founders of the Society, and to those who have passed the Major examination—the title of Pharmaceutical Chemist—that I think should be zealously guarded; it is a "vested interest," and as much entitled to respect and reservation as the vested interest in the drug trade of those men who may be in business at the passing of the Act; but if it be possible to give all men, registered under the Chemists and Druggists Act, a voice, and thereby an interest, in the registering board, I consider it would be wise and politic to do so.

I may tell you that on this very morning the Vice-President and myself have had an interview with the promoters of the "Chemists and Druggists Bill, No. 2." It was suggested to us by a most influential member of the Select Committee of the House of Commons, who felt that time might be saved by such a meeting, and indeed time is now important, for it is generally understood that the present Session of Parliament will be a short one. And, gentlemen, I may remind you that all, or at least very many of you, may aid in forwarding our Bill. You have all representatives in Parliament; call on them, make them understand that the Pharmaceutical Society does represent the chemists and druggists of Great Britain more fully and perfectly than any other association. If we were to believe all we hear said on that subject, we should be driven to the conclusion that as soon as a man became incorporated with us he ceased to be a chemist and druggist, losing all interest in matters of trade, and becoming at once a mere votary of science by some refining process; that our learned professor perhaps had at last found the philosopher's stone, whereby he could convert the baser metals into gold. Gentlemen, we all know that the baser metals are England's wealth, and in like manner the good, sound, practical Pharmaceutical Chemist—chemist and druggist if you will—maintaining the credit of his cloth throughout the length and breadth of the land, is the type of the class we desire to develope. There may be brilliant examples cropping up now and then in our school, men who would have had no incentive to progress, no opportunity of rising from the common level but for this institution. We are proud of them; but they are exceptions only. I have always thought that the Great Exhibition of 1851 produced its greatest good not by bringing brilliant genius to the surface, but by its more quiet effect of introducing high art into common things, and so improving the taste of the whole population. No one, I think, can have failed to mark the change in English manufactures since 1851. And so, on a small scale, has the Pharmaceutical Society, by bringing its members into communication, and an honourable rivalry with each other, advanced the whole body, but not elevated them beyond their proper position.

Gentlemen, there are no strictly Pharmaceutical subjects for me to bring before you this morning, and if there were, I feel that for the moment our attention is so completely absorbed by what I may call the political affairs of our community that other matters would be deemed out of place, and that even now perhaps I may have trespassed too much on the time of the meeting which would have been better occupied by others. We will therefore, if you please, proceed to business, which our Secretary will commence by reading the Report of the Council.

FINANCIAL STATEMENT.—*From 1st January to 31st December*, 1864.

RECEIPTS.				£.	s.	d.
Balance in Treasurer's hands				443	6	11
Benevolent Fund:						
Donations	13	13	0			
Subscriptions	153	2	0			
Interest	180	13	11			
				347	8	11
Life Members' Fund:						
Fees	78	15	0			
Interest	70	10	1	149	5	1
Government Securities:						
Interest				29	3	9
Rent				83	10	0
Arrears of Subscription				186	7	6
Donation to the Society				1	1	0
Subscriptions:						
352 London Members	369	12	0			
1418 Country Members	1488	18	0			
104 Associates	54	12	0			
113 Apprentices	59	6	6			
				1972	8	6
Fees:						
65 Pharmaceutical Chemists . . .	470	8	0			
58 Assistants	243	12	0			
103 Apprentices	216	6	0			
38 Registration Certificates	1	18	0			
				932	4	0
Fees:						
Lecture				152	15	6
Laboratory				424	8	0
Balance due to Secretary				2	11	6
				£4724	10	8

EXPENDITURE.				£.	s.	d.
Benevolent Fund:						
Relief granted	£115	0	0			
Investment	232	8	11			
				347	8	11
Life Members' Fund:						
Investment				78	15	0
Government Securities' Investment	564	19	5	500	0	0
Conversazione	67	6	4			
Pharmaceutical Meetings .	13	11	2½			
Repayments	2	2	0			
Sundries	18	18	0			
				101	17	6½
House Expenses				41	5	5
Rent, Rates, Taxes, and Insurance .				446	14	7
Repairs and Alterations				28	19	1
Fixtures and Fittings				50	10	3
Apparatus				18	2	8
Library				47	10	5
Museum				0	12	10
Furniture				14	9	9
Stationery				16	7	8½
Postage				56	1	1
Printing and Engraving				95	5	3
Advertisements				23	4	0
Journals: Balance of Account				47	8	9
Carriage				2	2	8
Collector's Commission				31	4	0
Travelling Expenses				137	18	11
Secretary and Registrar's Salary . .				300	0	0
Gratuity to Secretary and Registrar				21	0	0
Wages				166	1	0
Expenses of Society in Scotland . . .				61	11	0
Board of Examiners				120	15	0
Professor of Chemistry and Pharmacy, including duties as Curator, etc.				300	0	0
Professor of Botany and Materia Medica, including duties as Curator, etc.				250	0	
Special Lectures				18	12	0
Subscription to Royal Botanic Gardens				21	0	0
Prize Medals, etc.				6	1	6
Laboratory:						
Director's Salary and Percentage on Fees	293	14	3			
Demonstrator	100	0	0			
Porter's Wages	53	0	0			
Chemicals, etc.	106	11	2			
				553	5	5
Repayment to Secretary				5	5	1
Balance in Treasurer's hands				815	0	1
				£4724	10	8

We, the undersigned Auditors, have examined the Accounts of the Pharmaceutical Society, and find them correct agreeably with the foregoing statement, and that, as shown by the Books of the Society, there was standing in the names of the Trustees of the Society, at the Bank of England, on the 31st of December, 1864:—

	£	s.	d.
On Account of the General Fund, New 3 per Cents	£1564	19	5
Life Members' Fund, 3 per Cent. Consols	2563	11	11
Benevolent Fund, 3 per Cent. Consols	6440	5	4
Bell Memorial Fund, 3 per Cent. Consols	2050	0	0

FREDERICK BARRON,
JAMES BURGOYNE,
MICHAEL CARTEIGHE, } Auditors.
JAMES CRISPE,
JOHN GARLE.

February 21, 1865.

The Council have again the satisfaction of commencing their annual report with a favourable financial statement,—a statement which gives ample evidence of a healthy vigour in the Pharmaceutical Society, and the estimation in which it is held by the trade it represents. On examination it will be seen, that whereas, in 1863, the subscriptions and fees amounted to £2715. 1*s*., they were in 1864 £3167. 17*s*., being an actual increase of £452. 16*s*., or rather more than 14 per cent. When it is further noticed that the improvement occurs principally in the fees received by the registrar, the satisfaction is increased, because it is thereby proved that the one great object of the institution is steadily progressing. The advance in the lecture and laboratory fees, although small, tends also to demonstrate that the desire for education spreads among those who are hereafter to uphold the honour of Pharmacy in Great Britain: that they will also exert themselves in supporting the Society which has opened for them the road to distinction may be fairly inferred by the greater desire manifested by assistants and apprentices under the Pharmacy Act to connect themselves with the Society. In 1863 there were 93 subscribing associates and 66 apprentices; in 1864, 104 associates and 113 apprentices.

The attendance at the morning lectures delivered by the professors has been somewhat better than in preceding sessions, and the number of students in the laboratory, as well as lecture-room, is larger; the financial statement dealing with the receipts and disbursements of a year, beginning and ending in the middle of a session, does not show exactly the present condition of the school, and the Council have much pleasure in stating that the attendance for 1864–65, is better than that of 1863–64, although still below the standard hoped for when such extensive alterations were made in the laboratories. A much larger class might be accommodated, but it cannot be doubted that apprentices now enjoy greater opportunities of acquiring a knowledge of the science of Pharmacy in the ordinary routine of their business than were afforded formerly; and those who are diligent in the use of those opportunities never appear here until they come for examination. This school was established to supply a great want, and it is satisfactory to find that want less urgent now than it was twenty years ago; its diminution may be in a great measure ascribed to the influence of the Pharmaceutical Society, which first drew attention to the unsatisfactory condition of Pharmacy in Great Britain, and has since acted as a constant stimulus to improvement. That this is not a merely imaginative inference, but one drawn from the statistics of the Board of Examiners, is shown by the following figures:—

	Candidates for Major and Minor Exams.	Had not attended Lectures.	Had not attended Laboratory.
1862	75	32	49
1863	100	59	84
1864	152	89	123

Now, taking into consideration that the Pharmaceutical Society was instituted to advance the qualification of dispensers in the aggregate, rather than individually, the demand for examination must be taken as better evidence of success than the extent of the school. Still the Council would not for a moment relax their efforts to maintain the School of Pharmacy in the highest state of efficiency, deeming the outlay of the Society's money thus incurred a most judicious expenditure. They trust Pharmaceutical Chemists generally will aid them by insisting on a good preliminary education in apprentices.

In the Report of 1864 it was stated that no applicant had ever appeared for the "Senior" Bell Scholarship, and the Council had consequently resolved to grant two "Juniors," rather than allow half the benefit of the endowment to lie dormant in any one year. At the commencement of the present session a claim was put in for the Senior, and so well sustained in the examination by Mr.

Watts, that the Council had no difficulty as to the award, and have now the satisfaction of reporting that both scholarships have this year been granted according to the original intention of the founders.

The general expenses of the Society have not increased, and the cost of publishing and distributing the Journal has been diminished. In the last report the balance against the Journal was £70; it is now reduced to £47. 8*s.*, which is all the outlay incurred by the Society for a journal of which 36,000 copies are distributed annually to its members and associates free of charge.

Besides investing the sums belonging specially to the Life Members' and Benevolent Funds, the Council were enabled in 1864 to add £500 to the invested capital of the General Fund, and still the account closes with a balance of £815. 0*s.* 10*d.* in the treasurer's hands (nearly double the amount of that which appears at the commencement of the year). Of this a further investment of £500 has taken place since Christmas.

Although the gross sum contributed to the Benevolent Fund is somewhat less than in the preceding year, it represents a more cheering prospect; inasmuch as it comes from annual subscribers, of whom the number is greatly augmented. The subscriptions in 1864 doubled those of 1863. The Council have further the pleasure of announcing that the recent revision of the regulations for the distribution of the fund has been practically approved, in the most satisfactory manner, by subscriptions and donations to the extent of £215 in the *first four months of the current year*,—a sum exceeding the contributions for the whole of any previous year.

The disbursements on behalf of this fund, as usual, stand first on the expenditure side of the statement, and, it will be seen, a smaller sum has been required for relief and a larger amount invested in Government securities than in 1863.

During the present year an important arrangement has been made by the Council to enable chemists and druggists in business on their own account to appear before the Board of Examiners apart from what may be termed *junior* candidates.

The question had been long under consideration. It was felt that union with the Pharmaceutical Society not being compulsory, but it being nevertheless desirable to extend it as far as possible without sacrifice of principle, all unnecessary impediments should be removed. Great care was, however, necessary in arranging the synopsis for these "separate examinations." To have reduced the standard of knowledge would have rendered the examiners' certificate valueless to those who passed the Board; would have been an injustice to Pharmaceutical Chemists previously examined, and positive destruction to the Society itself. The Council believe that the great experience of the Board of Examiners enabled them to overcome the difficulty, and while, on the one hand, it will be admitted that the requirements are not excessive, it must, on the other, be allowed that the chemist who complies with them, and has in addition the benefit of certain practical experience, is fully entitled to a certificate of competency. The success of the arrangement seems to be established by the number who have already availed themselves of it; and the assurance that the examination will be faithfully carried out, leads candidates to make due preparation.

The present method of appointing Local Secretaries appears to work well, and these gentlemen have rendered great assistance since the last annual meeting. More than usual activity has been required of them in communicating with chemists and druggists throughout the country on the matter of legislation, and the work has been done not only cheerfully, but successfully. From the earnest goodwill with which their time and labour have been given, the Council feel that the attendant success must be a most gratifying reward, and cannot omit this opportunity of publicly acknowledging their services.

Legislation has withal been the great feature of 1864–65, and it is hoped that the "Chemists and Druggists Act" of this year will take its place in the Statute Book as the consummation of the Pharmacy Act of 1852. During the progress of the Bill through Parliament it is difficult to speak with any certainty, and as to the proceedings of the Council, they have been amply reported and commented on from time to time in the Journal and Transactions. The work has been one of no small labour and anxiety. There is always a difficulty in infusing a knowledge of special subjects into the minds of men who have no practical acquaintance therewith, and although the demand for the educational qualification of chemists and druggists, put forth by the Medical Council in 1864 and at once indorsed by the public, has been earnestly taken up in Parliament, there yet remains much more for the Council to do.

During the past year one of the oldest members of the Council has been removed. It would be unreasonable to mourn the loss of him who goes down full of years and honour to the grave, but a feeling of regret comes over us when we miss a cheery voice to which we have long been accustomed. Among the founders and supporters of the Pharmaceutical Society there was not one more active, more earnest, or more honest than Thomas Herring, of whose assistance and encouragement we are now deprived. His memory will remain, and it may be that some will say, with justice too, that Thomas Herring worked hard for the advancement of Pharmacy years before the Pharmaceutical Society was thought of.

Mr. Hollier, in moving the adoption of the Report, congratulated the meeting upon the very satisfactory position of the Society with respect to its income and expenditure, the former being much larger than that of last year, whilst the expenditure had not been, perhaps, much more this year than it was last year. That was a fact upon which they might safely congratulate themselves; and with regard to the Report that had been read, he felt certain it would be received with great pleasure by all the members and friends of the institution. He must, however, express his regret at so small an attendance of country members, especially as he had always looked upon their annual meeting as one of the high holidays of the year. It was but natural that a larger number of London members than country members should assemble on these occasions, but on the present occasion, when they had a Bill before Parliament, which was of vital consequence to them, he certainly anticipated seeing a very large attendance of country members. It was, however, satisfactory to find that the country members felt they were so ably supported by the Council, in whose hands they were disposed to place themselves, that they could safely leave what was best to be done to them, and if it were possible to carry a Bill through Parliament that would not interfere with the privilege and influence of the Pharmaceutical Council, he thought that it would not only be acceptable to the public, but also to the great body of the chemists and druggists. He felt certain that many of the latter would rather have such a Bill carried than tha promoted by the United Society. It had been stated in the 'Chemist and Druggist' that the support given to the Bill now before Parliament had been obtained, in some instances, by misrepresentation, and as he had taken a great interest in the matter, he wrote to the editor upon the subject, informing him of the mistake he had made, and he (Mr. Hollier) had taken care to communicate his opinion upon the matter to the proper authorities. He had taken a great interest in the Society, and he had taken part in the country in the agitation that had occurred with reference to further legislation. He wished to see the privileges of the Society maintained, but at the same time he was desirous of seeing the outsiders admitted into their ranks, if it could be done, and it was the opinion of some that by an amalgamation it would be possible to get a Bill that would work satisfactorily for all parties. The sale of poisons was a very difficult question, and if they could legislate satisfactorily with reference to it and dangerous drugs, it would advance materially the interests not only of Pharmaceutical Chemists, but also the chemist and druggist generally. He could state from his own knowledge in his own district, that drysalters distributed these poisons and dangerous drugs at great risk to the public and themselves; but he thought it might be prevented by the introduction of a clause into the present Bill. Between the two Bills he thought it was possible to produce a good one. It had been urged against this Society that there were many members who had not passed an examination, but it should be recollected that those were the men who, twenty years ago, banded themselves together and paid their money with the view of founding this Society for the joint benefit of themselves and others. It was urged that apprentices and associates were put to a great expense in passing their examination, but it was done at a comparatively small cost to them, the greater portion being paid from the subscriptions of the members. He cordially concurred in the Report. As a local secretary he had called meetings of the profession within his own district, and he must admit that they had always listened attentively and carefully to everything he had put before them; and if they could so construct a clause as would meet the views of the outsiders, he felt certain that many of them would be heartily willing to join this Society. He concluded by moving the following resolution, "That the Report now read be received and adopted, and printed in the Society's Journal and Transactions."

Mr. Humpage had much pleasure in seconding the motion. The financial Report was most encouraging, and it had been so completely analysed in the Report that had just been read, that it was unnecessary for him to enter into any details. The finances were increasing in the right direction, and it was a matter of congratulation to find that the large sum which at one time was charged against the Journal had been so materially reduced. The candidates for admission was another matter for congratulation. In 1862 the examinations were only seventy-five, and in 1864 they had increased to 152, and the most surprising thing was to find that most of them had been able to pass without having first to attend the Society's lectures or the laboratory, which was due to those examined members who had taken apprentices being so thoroughly competent to instruct them in the various branches of the profession. It would have been impossible twenty-five years ago for eighty-nine young men to have presented themselves for examination without having first had to go through a course of instruction similar to that which was to be obtained by attending the lectures and the laboratory. In dealing with the question of what were termed the outsiders, two interests were to be considered. He had met with many of them who came up to the true ordeal which the Society had established, but he who could not ensure a few weeks' attention which would enable him to take his true position ought not to be admitted a member. With regard to the subject of legislation, he admitted it would be a very good thing if the sale of drugs and medicines could be confined to educated men only, but the question was, how was it to be accomplished? It was, he admitted, a difficult question, but he thought the best thing the Society could do would be to leave it in the hands of the Council to solve. Their past conduct had been all that they could wish, and he felt confident they would do everything in their power for the advancement of the Society, and also of individual members of the profession. The Society was in a very healthy position, and the man who said to the contrary was—he would not say what. The Society was never more healthy than at present, and though the cost of legislation would be—must necessarily be—heavy, it would be the best mode of advertising that ever could have been adopted, for hundreds, nay thousands, now read about the Pharmaceutical Society who, prior to the agitation, knew nothing about it, and probably could not pronounce its name. He was confident that the more the Society was known the better it would be appreciated, and whenever he had come in contact with persons who really had inquired about it for the purpose of information, he had had no difficulty in proving to them that if the Society had not done everything that was wished, it had accomplished sufficient to make the profession and the public thankful for its existence.

Mr. Collins said that a stranger would imagine, after having heard the speeches of the mover and seconder of the motion, that there never had been such a Society before, and that they were never likely to have such another. Now, with regard to the subject of legislation, he should be glad if information could be given to him and to the meeting with reference to the progress of the Bill now before Parliament.

The President said that had already been done.

Mr. Collins (who came in late) said then he must not complain. He must say, however, that he thought the Medical Council had put forward a most extraordinary recommendation with regard to the Bill. He hoped that those who had charge of the Bill would not allow such a monstrous clause to be inserted. He and many others had no desire to prescribe in the strict sense of the word over the counter; but whilst medical men sent out medicine, he thought they ought not to object to chemists and druggists prescribing any simple remedy over the counter. If they dealt in those matters they knew the penalty which attached to it, and, should application be made to them, every sensible man, when he saw a case of difficulty, would advise the applicant to apply to a properly qualified man.

Mr. Hills said that he had never heard it mentioned that the Medical Council wished to prevent Pharmaceutical Chemists from prescribing over the counter.

Mr. Collins said it appeared so from the report published by the Medical Council.

The President said it went only so far as to say, that the Bill now before Parliament should not be supposed to give any authority to practise. The object was to discourage it as much as possible. It was a mere expression of opinion, and not binding upon any one.

Mr. Collins said he thought there was something behind it, and asked for an explanation of what was meant by "any branch of medicine." His opinion was, that under that clause, a chemist and druggist might be prevented from prescribing a simple chalk mixture, under the plea that he was practising a branch of medicine, and he called upon the Council to strongly oppose any restriction being placed upon their present liberty with regard to prescribing. What the chemists and druggists wanted to be was not prescribers, but the sole compounders of medicines. He next called attention to the discontinuance on the voting-paper of the number of attendances of the respective members of the Council. Probably there were good reasons for it.

Mr. Hills said Mr. Collins would find the information he required in the Journal.

Mr. Collins said that was so, and he had been obliged to go there for it, and at much pains and trouble he had arrived at it, and he thought it showed the misapprehension that existed as to the desirability of having so many country members on the Council. There had been eleven meetings of the Council during the last year, and he found that although one country member, Mr. Savage, had attended ten meetings, yet others had only attended four or five times. The attendance of country members must necessarily be less than town members, and the election of so many country members of the Council had the practical effect of throwing the management of the Society into the hands of the few London members who attended. All the Committee work was done by the town members, and the country members were only required to attend and receive their reports. He had thought it right to mention the matter, and he hoped it would be reported in the Journal. It was found on a former occasion highly important and necessary that the information now withheld should be given, and he saw no reason why it should not be continued. In conclusion, Mr. Collins called attention to the 'Chemists and Druggists Bill (No. 2)' which he characterized as a most monstrous Bill, but he hoped something might be done between the two Bills that would give the public and the profession satisfaction.

Mr. Savage said he must reply to Mr. Collins's remarks, although he was one of those who had been complimented by him. He felt that many of the members of the Council had been unfairly represented by that gentleman, because the attendance of the Council, as given in the Journal, was no criterion of the amount of work performed by the various members; besides, it would be very unjust towards the Society if the country members of the Council incurred large expenses for travelling, when their attendances were not absolutely required. Mr. Collins was wrong in his statement with reference to the number of meetings. There had been fourteen, and out of that number he had attended twelve of them, and the same applied to many other of the members. Allusion had been made to Mr. Edwards, but surely it was not desirable that that gentleman, and others, who reside at a great distance from town, should come up, at a great expense, if there was no business to be transacted which required their especial attention; and it was desirable to avoid, as much as possible, two members of the Council coming from the same place. It had been urged that it was only by the number of attendances that the members could know how to vote for the re-election of the Council, but he begged to inform him that it was a most fallacious test, and no publicity of the kind would give the remotest idea of the quantity of work performed by each individual member of the Council; it could only be obtained from inquiries on the spot, and he thought it would be unwise, injudicious, and unfair, from the circumstances he had stated, if the Council were to publish a summary of the attendances. In justice to the other members of the

Council, it was but right that he should say they had all been present on every occasion when their services were required, and they had most efficiently discharged their duties, and if the Society was more indebted to some than to others for their attendances, they were much indebted to Mr. Edwards and Mr. Mackay, to the latter of whom they were indebted for the great reduction that had taken place in the cost of the Journal. In fact, they were greatly indebted to the two Mr. Edwards, for the valuable and vigilant attention they had paid to the interests of the Society. The mover of the adoption of the Report had said that it was very desirable to insert in our Bill certain portions of the United Society's Bill, but there was, as there always had been, great difficulty about the matter. Now the question of poisons had never been solved. It had been often mooted there, but no one had been able to solve it. Many persons had been poisoned from drinking excessively of gin, but to suppose that Government would pass a special enactment with regard to the sale of gin, was absurd.

Mr. Collins said Mr. Savage had mentioned fourteen meetings of the Council during the year. They were only monthly meetings, and he was not aware there were more than twelve months in the year.

Mr. Flux (Solicitor) asked to be permitted to address the meeting. Time, he assured them, was very pressing with reference to the Bill before Parliament, and the Council were then waiting to hold another meeting in order to decide upon their course the following day before the Select Committee. He wished to inform the meeting that he could from experience state that the attendances of the Council were fallacious, and could not be relied on as a test of the work done. And if they knew, as he did, how much time the Council devoted to the affairs of the Society they would be truly astonished, and if they were to do as lawyers do, charge for their attendances, the Society would have such a bill to pay that they would never be able to meet. He wished to bear his testimony to the attendances of those gentlemen of the Council who lived at great distances from London. During the past year the claims on the members of the Council had been without precedent. He had had to communicate with them on numberless occasions, and he did not know an instance in which he could not do so when necessary and in which he did not find their time most willingly given. Instance the present Bill, Mr. Black, one of the members for Edinburgh, being on the Select Committee, he (Mr. Flux) considered it necessary for the support of the Bill that Mr. Mackay should appear before the Committee. He telegraphed to him, and at great personal inconvenience he was in the House of Commons on Thursday last, he had remained in town ever since, and would again go before the Committee the following day at great sacrifice of his business time. Then, again, Dr. Edwards stood in precisely the same position. He came to town last week, but as his engagements required him to return home he did so, and he was again in the committee-room on the following Monday and had remained in town ever since. They had now wasted nearly half an hour about what had come to be a fallacy after all. He entreated them to stick as closely as they could to the business of the day, and allow the Council to adjourn to the Council-room and dispose of the important business that must come before them that day.

Mr. Collins complained that it was irregular for the Solicitor to give them such advice. It was not allowed in other societies.

The President said that Mr. Flux first asked permission to address them. He thought it might now be desirable that he should state to them how the Bill stood in Parliament. There had been two sittings of the committee. At the first meeting they had to prove that legislation was necessary, and that they did to the perfect satisfaction of the committee. On the second occasion, certain medical men were called, who proved that the Society's examinations were efficient. After they have disposed of Bill No. 1, the committee will proceed with Bill No. 2 (the United Society's Bill). On Monday last, a rather important member of the select committee suggested that the Council should have a conference with the promoters of the Bill No. 2. The Council assented to it, and it took place that morning at half-past nine o'clock; two gentlemen and the secretary of the United Society having come there for the purpose. The conference lasted till eleven o'clock, and the end of it was that they proposed as a *sine quâ non* that all Chemists in business should be admitted on the passing of the Act to the register of Pharmaceutical Chemists. The other matters were merely arrangements of details less liberal than those in No. 1 Bill. The great point made by the deputation had not been sufficiently considered by the Council, but after that meeting the

Council would again consider the proposition, in order to decide upon it. The Council proposed to make an alteration in their Bill, which would give the members of the trade a more extensive voice in the election of the Council. By the 16th clause it was proposed that chemists and druggists registered under the Act, having passed the Minor examination, might be elected Associates, and might vote at the meetings of the Society. It was now proposed to alter the clause so that all the chemists and druggists registered under the Act, whether they passed the Minor examination or not, should be as eligible as Associates to have a vote at the Society's meetings. It was also proposed to allow in future all voters the same privilege as that now enjoyed by country members, that of sending their voting papers, and to insert a clause in the Bill guaranteeing exemption from serving on juries to all who were registered under the Act. The Council thought these concessions would be ample—that they were very liberal—protecting nothing but the title of Pharmaceutical Chemist.

Mr. Pedler hoped the meeting would not pass over in silence the demand which the United Society had made as a *sine quâ non*. He could not for a moment allow it to be considered that they at all assented to it.

Mr. Waugh asked if he was to understand that the meeting wished to limit the discretion of the Council in that respect. Did they mean to say that they could not allow those gentlemen to come in on the terms proposed? It was very necessary that the meeting should most unequivocally decide what should be done by the Council. He was in this difficulty, that he did not know who the gentlemen referred to represented, and he wished to be informed whether they were authorized to speak the sentiments of those who were called outsiders, as the Council was those of the Pharmaceutical Chemists and Druggists. Unless they were assured of that, they did not know that the outside gentlemen would be disposed to accept what they might do in the matter. The United Society, he thought, was something in the position of the United States, and that many of them would object to be represented by the persons who were holding the conference.

Mr. Watts reminded the meeting that last year the admission of chemists and druggists to the benefits of the Pharmaceutical Society was somewhat fully discussed, and Mr. Dickinson on that occasion made some very pertinent and just remarks upon the question. He (Mr. Watts) had been connected with the Society almost ever since its formation, and he should loudly protest against those gentlemen being admitted to all the privileges of the Society. With regard to the other alterations he did not object to them, and he must add that he considered them very liberal indeed. When they might have joined the Society in 1852 they objected, because, they said, they would only get the Journal for their guinea, and they did not want it; but the moment the Society had a Bill passed exempting Pharmaceutical Chemists from serving on juries, they thought it was something worth having for their guinea. He protested against their being admitted to the position which the members of the Society had worked for, laboured for, and paid for, and that if they were admitted as Associates it would be treating them very liberally. He hoped the meeting would not separate without passing a unanimous vote to that effect.

Mr. Collins said he thought it would be very indiscreet of the meeting to do so. They had much better leave the Council unfettered in the matter, because it would place them in this difficulty, that if the select committee insisted upon it they would have to abandon the Bill. The members of the Council, he was proud to say, were men of the world, of great experience and judgment, and capable of being trusted in the matter. They knew what was wanted, and would, no doubt, do all in their power to get it; but if they could not, why we must say no more about it. They must recollect that the select committee might report that it was desirable to legislate in a certain way. If so, what was then to be done?

Mr. Long expressed a hope that they would not lose their Bill through any bickerings between the two Societies.

Mr. Randall considered it was much better to leave the Council to deal with the Bill before Parliament in the manner they deemed best, and not pass any abstract resolution. At the same time, it would be desirable to strengthen their hands by an expression of the opinion of the meeting. There was more to be done by constituents writing or talking to their representatives than by passing abstract resolutions. To show the Council what was the general feeling of the meeting would be a much better guidance for them than a mere resolution. He would rather throw the Bill over than be dishonest towards the present body of Pharmaceutical Chemists; and he could assure them that he should be the last man to feel pleasure in thrusting his tongue in his cheek, as Mr. Collins had advised them. He thought it would be desirable if they could now let in the outsiders on the same terms as were proposed in 1852, but he confessed he was at a loss to see how it could be done. He advised the meeting to re-elect every member of the Council, who he felt certain would go back and complete the work that they had well and earnestly begun.

Mr. Pedler said he had the greatest confidence in the Council, and so far from appearing to sanction the kind of compromise that had been thrown out, he would rather lose fifty Bills than lower the standard of the Society. He hoped the meeting would place implicit confidence in the Council, and leave the matter in their hands.

The resolution was then put, and carried unanimously.

Mr. Pedler then moved the next resolution:—"That the thanks of the meeting be tendered and are hereby given to the President and Council, for their active and zealous services on behalf of the Society during the past year."

He said he was rejoiced to hear the statement just made by Mr. Flux, the solicitor, because he was a gentleman who, from his position with regard to the Society, was enabled to give a disinterested opinion with regard to the labour and the attendance of the members of the Council. There could be but one feeling with regard to the conduct of the Council during the past year, and that was that they had carried out to the very letter the views expressed by the meeting of last year. There could be no two opinions with reference to the two Bills before Parliament, and he thought it would be better to have no Bill at all than to be compelled to agree to the alteration mentioned by the President as required by the United Chemists and Druggists' Society. The manner in which the Council had transacted the business of the past year entitled them to the thanks of every member of the Society.

Mr. Boyce seconded the motion. He concurred in what had been stated by the last speaker, and he felt satisfied the meeting would have much pleasure in unanimously agreeing to the motion.

The motion was unanimously agreed to.

The President acknowledged the compliment on behalf of the Council. He heartily thanked them for the gratifying manner in which they had acknowledged the past services of the Council, and he assured them that what the Council felt to be their interest was and must be the interest of the whole profession. What they had now to do would be done in a liberal spirit, but at the same time in a conservative and just spirit towards those who enjoyed privileges under our present Act of Parliament. The Council, strengthened by the expression of the approbation and confidence of the meeting, would, he hoped, successfully terminate the work they had commenced. There was no intention on the part of the Select Committee to introduce such a clause as Mr. Collins imagined, and the proposition of the Medical Council would not interfere with a chemist's prescribing over the counter, as in certain circumstances he is compelled to do now. All that was intended was that Pharmaceutical Chemists and druggists should not take authority under the Bill to do so. The Bill, if carried, would prevent dispensing by men who had not passed an examination. Dr. Quain, when before the Select Committee, said it was utterly impossible to prevent chemists from prescribing over the counter altogether, but what was objected to was, chemists going out to visit patients. That was no part of their profession, and if they asked Parliament to restrict persons from encroaching on their grounds they ought to respect the preserves of others; but there was a case on record, brought before the Medical Council at its late sitting, where a chemist had gone beyond the legitimate range of his duties and taken charge of a benefit club; it was found, on inquiry, that the person referred to had been educated as a medical practitioner, though he had not passed his examination as such. The Medical Council, however, gave chemists credit generally for discountenancing such practice.

Mr. Orridge moved the thanks of the meeting to Mr. Bremridge, the Secretary. It was but due to that gentleman that they should recognize his valuable services.

The President hoped he should not be considered out of order if he seconded the vote of thanks to their estimable Secretary, Mr. Bremridge. He had been as much, if not more, in communication with him, than any member of the Council or of the

Society, and he could with truth assert that great credit was due to Mr. Bremridge for the assiduous manner in which he had so long discharged the onerous duties of his office. It was Mr. Bremridge who stirred them up and obtained for them exemption from serving on juries, and for that agitation, which had done the Society an inestimable amount of benefit, he thanked him. Mr. Bremridge was ever ready to advance the status of his profession, and he was ready to undertake any amount of work to accomplish that object.

The motion was carried by acclamation.

Mr. Bremridge, in returning thanks, expressed his grateful thanks to the meeting for the kind and cordial manner in which they had been pleased to recognize his services. He should be most happy at all times to do all he could to assist, in any way, the interests of the Society. He felt much pleased at the honour the meeting had unanimously conferred upon him.

The appointment of Scrutineers then took place, and the meeting was adjourned to Friday the 19th, to receive the report of the election of the Council for the ensuing year.

ADJOURNED MEETING.

Friday, May 19th, 1865.

MR. SANDFORD, PRESIDENT, IN THE CHAIR.

The Scrutineers brought up their Report, as follows:—

We, the undersigned Scrutineers, appointed at the Twenty-fourth Annual General Meeting of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting-papers committed to us, and report the following results:—

Voting-papers received.........	692
Disallowed for informality ...	17
	675

Ballard	184	Doughty	182	Haselden	559	Sandford	548
Bird	512	Edwards, G....	489	Hills	553	Standring ...	514
Bottle	512	Edwards, J. B.	586	Hollier.........	254	Thomas	203
Brady	353	Evans	479	Mackey	156	Vizer	172
Breton	223	Faulconer ...	219	Orridge	449	Watts	435
Collins.........	173	Hogg	186	Randall	445	Waugh	535

William Watts, *Chairman.*
Samuel Gale.
Henry Neal Boothby.
Thomas Kent.
Henry Owen Huskisson.
J. W. Clark.
Joseph Kettle.
Frederick Andrews.
Edwin Applegate.
Benj. Humpage.
Maurice Howell.
C. R. Quiller.

The following Members were therefore declared to constitute the Council for the ensuing year:—

Council.

Bird, William Lionel, 42, Castle Street East.
Bottle, Alexander, 37, Townwall Street, Dover.
Brady, Henry B., 40, Mosley Street, Newcastle-on-Tyne.
Deane, Henry, Clapham.
Davenport, John T., 33, Great Russell Street.
Edwards, George, Dartford.
Edwards, John B., Royal Institution, Liverpool.
Evans, Henry Sugden, 56, Hanover Street, Liverpool.
Hanbury, Daniel Bell, Plough Court, Lombard Street.
Haselden, Adolphus Frederick, 18, Conduit Street.
Hills, Thomas Hyde, 338, Oxford Street.

Mackay, John, 121, George Street, Edinburgh.
Morson, Thomas N. R., 38, Queen Square.
Orridge, Benjamin B., 30, Bucklesbury.
Randall, William Brodribb, 146, High Street, Southampton.
Sandford, George Webb, 47, Piccadilly.
Savage, William Dawson, 65, Edward Street, Brighton.
Squire, Peter, 277, Oxford Street.
Standring, Thomas, 1, Piccadilly, Manchester.
Watts, William Manning, 32, Whitecross Street.
Waugh, George, 177, Regent Street.

There being only the requisite number of Candidates proposed for election as Auditors, the Chairman declared the following, who had been nominated and had signified their willingness to accept the office, duly elected :—

Auditors.

Barron, Frederick, 2, Bush Lane.
Beckett, William E., 6, Giltspur Street.
M'Culloch, William, 5, Coleman Street.
Westwood, Robert, 16, Newgate Street.
Tippett, Benjamin M., 3, Sloane Street.

The Scrutineers handed to the President their Report of the return for the Local Secretaries.

A vote of thanks having been passed to the Scrutineers and to the Chairman, the meeting separated.

ORIGINAL AND EXTRACTED ARTICLES.

LIQUOR BISMUTHI.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Two communications have lately appeared upon the above subject; one from the pen of Mr. Bartlett, of America, and another from the pen of Mr. Blunt. On the appearance of the first, which was kindly forwarded to me by the author some months ago, I determined not to enter upon the theme again, as I thought the subject had been thoroughly ventilated in my original paper, and by the remarks made thereon by Mr. Schacht, the inventor of the fluid. Nor should I take up the time of the readers of your Journal now, except that my silence might be construed into an acknowledgment of the correctness of a statement made by Mr. Blunt, *i. e.* that he found the process of Mr. Tichborne impracticable. In connection with this, I may remark that I am sorry the process to which he refers has failed in his hands, but I shall be most happy, if he be sufficiently interested in the subject, to forward him a specimen containing the prescribed amount of oxide of bismuth, and made strictly according to my formula.

But, throwing this on one side, the purport of my original communication must have been misunderstood; indeed, it must have been read very superficially. In that communication the process is given as one calculated to produce a corresponding fluid to Mr. Schacht's. Thus, after having given the analysis, I say, "The following is probably the mode pursued in making the solution," etc., and then follows a process the product of which will agree in composition with the analysis of Mr. Schacht's preparation. A formula such as recommended by Mr. Blunt would not give a fluid representing Mr. Schacht's, as it would invariably contain nitric acid. My paper was written to describe what was then a novelty, and to give its composition, not to invent the best formula for its preparation.

In wishing good-bye to this subject, I may remark that Mr. Blunt's process is essentially Mr. Bartlett's, viz. the precipitation of citrate of bismuth by citrate of potash and nitrate of bismuth, and the solution of this in ammonia.

The whole of this will be found in my original paper, although in perhaps as many lines as pages have since been devoted to it. Thus I say, "It [Liq. Bismuthi] is more elegantly made by dissolving the citrate of bismuth in citrate of ammonia. Citrate of bismuth is a very insoluble salt, got by the double decomposition of citrate of potash, or soda, and ternitrate of bismuth. The citrate as made in this manner is extremely soluble in *ammonia*, or a solution of citrate of ammonia." The difference in Mr. Bartlett's modification of the above process is, that he adds ammonia to the citrate and forms a basic compound which is prone to decomposition, even with the addition of spirit; whilst if this bismuthic compound be dissolved in an excess of citrate of ammonia, and exactly neutralized, it will keep for an indefinite time without the addition of spirit.

Mr. Bartlett's paper contains, independently of the above process, some very interesting and original matter; but I cannot say the same of Mr. Blunt's, which is merely a repetition of the only part of Mr. Bartlett's communication which is wanting in this respect.

The objection to this process is the following:—Citrate of bismuth is not perfectly insoluble in water; therefore to get it anything approaching perfectly free from the nitrate of potash formed (not nitrate of ammonia), would entail so great a loss as to necessitate an analysis of the product before it could be made up a definite strength. If a quick method of making Liq. Bismuthi is required, and the presence of nitrates be no objection, this can be arranged in a very simple and efficacious manner, the whole operation only taking a few minutes.* A known weight of crystallized nitrate of bismuth is dissolved in a small quantity of water, to which has previously been added a like weight of citric acid. Ammonia is then added until it is neutralized, when it may be at once made up the required strength by the addition of water. This solution may be made any strength (50 per cent. if necessary), and will keep indefinitely. It contains, in addition to the bismuth and citrate of ammonia, a little less than 1½ grain of nitrate of ammonia for every three grains of nitrate of bismuth used.

Apologizing for trespassing on your valuable space,

I remain, yours obediently,

CHARLES R. C. TICHBORNE, F.C.S., F.R.G.S.I., etc.

Laboratory, Apothecaries' Hall of Ireland,
10*th May*, 1865.

ON MR. MILLER'S METHOD FOR THE DETECTION OF METHYLIC ALCOHOL.

BY HARRY NAPIER DRAPER, F.C.S.

As the processes hitherto given for the detection of methylic alcohol have proved so very unsatisfactory, it is not unlikely that the method given by Mr. John T. Miller in the April number of this Journal may remain untried, and his

* As I have stated before, nitric acid is always present in the solution made from precipitated citrate of ammonia. There seems to be a limit to the solubility of chemically pure citrate of bismuth; but this solubility is wonderfully increased by the presence of mineral acids.

statements as to its accuracy received *cum grano salis* by many who have been disappointed by the fair promises of success already held out.

For this reason I wish to place on record the results of a series of experiments in which the general applicability of Mr. Miller's process was tested to the utmost.

Nineteen specimens, the details of which are given below, were prepared for me by a friend, I not having the slightest knowledge of their composition. When my friend and I came to compare notes, we found that I had succeeded in detecting the presence of methylic alcohol in each of the specimens in which it was present, and in them only, except the two which are printed *in italics*. The order of the specimens here given is that according to which they were originally numbered.

1. *Spirit of nitre, with 8 per cent. methylated spirit of nitre.*
2. Methylated spirit of nitre.
3. Compound spirit of juniper.
4. Spirit of nitre.
5. Compound spirit of juniper, with 10 per cent. methylated spirit.
6. Methylated ether.
7. Ether.
8. Ether, with 5 per cent. methylated ether.
9. Ether, with 10 per cent. methylated ether.
10. Spirit of nitre.
11. Spirit of nitre, with 5 per cent. methylated spirit of nitre.
12. Spirit of nitre, with 10 per cent. methylated spirit of nitre.
13. *Spirit of nitre.*
14. Spirit of nitre, with 5 per cent. methylated spirit of nitre.
15. Spirit of nitre.
16. Tincture of opium, with 5 per cent. methylated spirit.
17. Tincture of opium, with 5 per cent. methylated spirit.
18. Tincture of opium.
19. Tincture of opium, with 10 per cent. methylated spirit.

No. 1 I had reported as pure, and No. 13 as methylated. In both of these cases it will be observed that the specimens were spirit of nitre, which Mr. Miller particularly points out as requiring more care than is necessary with tinctures. The reason of this is obvious, as, in pure spirit of nitre, aldehyd and perhaps formic acid must be present to a greater or less extent, and mask the result. I should mention that I have not found the preparatory treatment with carbonate of potassium of any advantage in the case of spirit of nitre.

I make no comment upon the failures. In No. 1 it will be seen that methylated spirit was present in the proportion of but 8 per cent., corresponding to but 0·8 per cent. of wood spirit, and to, of course, a still less proportion of real methyl alcohol. I am far, however, from thinking that the failures were due to the *method*, and think that now, having greater experience, I should have still better success. Mr. Miller himself does not claim for his process the degree of sensibility which I have required from it. When I have next to examine spirit of nitre, I shall distil the specimens from caustic soda or potash before oxidizing them. Beyond this I would make no alteration in the *modus operandi* of Mr. Miller, nor can I suggest any improvement upon it. A small glass Liebig's condenser, arranged vertically, will, however, be found convenient when a large number of distillations have to be made.

I must not forget to say that I have found the dark colour of the supernatant liquid, after the precipitate of reduced silver has completely subsided, the best indication of the presence of methylic alcohol. This coloration is very marked and permanent. I have two specimens before me as I write, one from pure spirit of nitre, and the other from spirit of nitre containing 10 per cent. of methylated spirit of nitre. In the former the supernatant liquid is now (three weeks after the experiment) quite colourless, and in the latter is of a pale wine-colour, but of a slightly browner tint than sherry.

Finally, I hope that the name of Mr. Miller will not be forgotten in connection with the first reliable process for the detection of this shameful form of adulteration, and that he himself will receive the thanks of all honest members of the pharmaceutical community.

Dublin, May 10th.

SPONTANEOUS OXIDATION OF AMORPHOUS (RED) PHOSPHORUS.

BY THOS. B. GROVES, F.C.S.

Perhaps the spontaneous oxidation of amorphous (red) phosphorus is not so well established a fact but that the following particulars may prove interesting, more especially since one of our best class-books, the ninth edition of Fownes's 'Chemistry,' states, without qualification, "that amorphous phosphorus has no tendency to combine with the oxygen of the air."

I have been accustomed for some years to use this variety for the preparation of medicinal phosphoric acid (*vide* Pharm. Journ. vol. xvi. p. 509). Two years ago, the bottle in which it was kept received a blow on its side, which produced a starred fracture, with a central hole the size of a large shot. This was not considered important, so the bottle remained in use, and continued to occupy its old position on a shelf in the warehouse, exposed to diffuse daylight only. For a year or more it presented its pristine appearance, but more recently I observed it to be getting damp, and on proceeding a fortnight since to take some from the bottle I found it covered with a layer, a third of an inch thick, of dense acid. The odour of oxidizing phosphorus, was very pronounced, but the contents of the bottle were not luminous in the dark. The acid was washed from the unaltered phosphorus, and examined. It consisted of phosphoric and phosphorous acids in the proportion of 5 eq. of the former to 2 eq. of the latter, and the quantity was such as would result from the oxidation of more than eleven drachms of phosphorus,—about a sixth of the whole contents of the bottle.

The relative proportions of the two oxides of phosphorus were ascertained by comparing the results of two estimations by magnesia, one before, the other after peroxidation by chlorine, from which it seems that the mixed and diffused completely form the so-called phosphatic acid ($4PO_5+PO_3$) of Pelletier and Dulong.

I am quite at a loss to account for any sudden change from stability to instability, and am consequently disposed to believe that the change had been, from the first admission of air, advancing with *a regularly accelerated speed*, and that hence arose the apparent suddenness of it.

POISONING BY OXALIC ACID AND STRYCHNINE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—If the following report will be worth a place in the pages of the 'Pharmaceutical Journal,' it may form a permanent record of a rather extraordinary case of poisoning which occurred here a few days ago. A woman about thirty-five years of age, of dissipated habits, applied at the shop of a chemist in this town for oxalic acid, for the stated purpose of destroying mice. She was told that oxalic acid was not used for killing vermin, and recommended to have a packet of *Hunter's vermin-killer*. This she accordingly purchased, but applied immediately afterwards *for oxalic acid* at the shop of another chemist. Upon being questioned as to the purpose for which it was wanted, and cautioned as to its use, she was supplied with an ounce of it, properly described and labelled. She adjourned to a neighbouring public-house, mixed the *oxalic acid* and *vermin-killer* with half a pint of ale, and drank the greater part of the contents. She went at once to her home and told her neighbours that she had taken an ounce of "oxalic acid" and a packet of "mice powder." Her statement was at first hardly credited, but upon her assertion of its truth, another chemist was called in, who administered whiting and water, advising that a medical man should be sent for. Mr. Houghton, a surgeon of the town, immediately attended, and found her nearly pulseless with cold clammy perspiration, extremities cold, and every appearance of rapid dissolution. He left her with the intention of procuring his stomach-pump and antidotes, but upon his return, in the course of a few minutes, she was dead. The oxalic acid and vermin-killer, as nearly as could be ascertained, were purchased about eleven o'clock. The landlady of the public-house stated in evidence that it would be from ten to fifteen minutes after that time when she applied for the ale; the chemist administered the whiting and water in certainly not more than twelve or fifteen minutes after the poisons were taken; and death took place about 11.45, thus giving twenty-five to thirty minutes for the operation of the poisons to destroy life. She vomited slightly, and complained of soreness of the mouth, but did not appear to suffer much pain. Upon the *post-mortem* examination, the other organs of the body, excepting the stomach, were healthy. This contained from half to a pint of dark, grumous, bloody liquid. The mucous membrane was highly congested, and in one part a patch, of at least 2½ inches in diameter, had the appearance of being charred, and was so softened and destroyed that it peeled away upon the slightest touch. The evidence as to the cause of death appearing so clear, the coroner and jury did not consider it necessary for any analysis of the contents of the stomach itself to be made; but feeling considerable interest in the case, and having been present at the examination and inquest, by the kindness of the surgeon I obtained both for chemical examination as to the quantity of oxalic acid which was taken. From the evidence of the servant at the public-house, it would appear that something like a dessert-spoonful of "salty stuff" was left in the cup, but which unfortunately was thrown away. I do not think, however, it could have been less than half an ounce, probably much more, which was swallowed. I was also anxious to ascertain as to whether any symptoms observable before death could have reference to the operation of strychnine in the vermin-killer. One witness only spoke as to a "stretching sort of a fit," but nothing definite could be ascertained. The stomach, as I have before observed, contained from half to a pint of dark fluid, together with a considerable quantity of a white chalky paste (oxalate of lime), all of which I handed to my son for examination. The fluid gave but a slight acid reaction with blue litmus-paper. The white chalky paste was washed and boiled in distilled water with carbonate of potash. The liquid was filtered, neutralized with nitric acid, and upon the application of the ordinary tests, gave abundant indication of the presence of oxalic acid in very large quantity. From the extraordinary circumstance of oxalic acid and vermin-killer having been taken at one and the same time, and the rapid destruction of life being more especially referable *to poisoning by oxalic acid alone*, both my son and myself directed especial attention to the examination of the liquid contents of the stomach as to strychnine. As may be known to any one who has examined them, "vermin-killers" are intensely bitter to the taste,—of itself almost confirmative of this poison being the active principle. The fluid part of the stomach was diluted with water, decolorized by animal charcoal, filtered, concentrated and tested with sulphuric acid and chromate of potash, which produced the characteristic crimson and deep red colour. Strong nitric acid also imparted a deep red colour to the liquid. These tests appearing sufficiently indicative of the presence of strychnine, no others were applied. I am, Mr. Editor, yours respectfully,

E. Hollier, Pharmaceutical Chemist.

Dudley, May 15, 1865.

CHEMISTS—PAINS AND PENALTIES.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—The proceedings of the Medical Council seem rather to indicate a disposition on their part to lay chemists under severe and impracticable restrictions in conducting their ordinary business as it has always been conducted from its earliest origin. I think there are very grave reasons why such restrictions, pains, and penalties should be resisted to the very utmost by every class and order of chemists. I believe the members of the Medical Council are not actuated by that mean, jealous hostility to our fraternity which does undoubtedly exist in some lower sections of the medical profession, under the paltry idea that we are rivals in occupation, but that it arises in a great measure from erroneous views of the real position in which we stand towards them and the public. But from whatever cause arising, or from whatever quarter proceeding, it is unquestionably the duty of all classes of chemists to resist such restrictions, pains, and penalties to the last extremity, and for the following obvious reasons:—

Firstly. Such legislation is quite foreign to the nature and objects of either of the Bills now before the House of Commons; so much so, in fact, that it was the threat (many years ago) to lay us under these very degrading penalties that originated the Pharmaceutical Society, one of its principal objects being to protect ourselves from *all such oppressive legislation.*

Secondly. It is quite unnecessary for the object in view by the Medical Council, which, of course, is to prevent chemists practising as medical men. No doubt many chemists do trench too far upon the duties of the medical profession, but these cases, in *comparison* to the whole body, are but few, and the numbers really acting as medical practitioners to any extent are exceedingly few; the responsibilities and difficulties are already so great in the way of this, that further restrictions are quite uncalled-for, and to impose pains and penalties upon the whole body on account of the *mal*practices of a few would be most tyrannical, oppressive, and unjust.

Thirdly. It is quite impracticable, without utterly destroying the proper and legitimate business of the chemist altogether. It may be that some few here and there can exist without even suggesting a black draught, a chalk mixture, an anodyne draught, an emetic, or a dose of Gregory's mixture, but in the immense majority of cases chemists are absolutely obliged to answer a thousand questions from all classes of customers, from the peer to the peasant, which result in their obtaining such medicines as named, and many others, without the interposition of a medical man; nor would one of these cases in one hundred, if all information was absolutely refused by the chemist, result in any application to a medical man. Their own judgment would be used, medical books would be consulted, or some one else, not being a chemist under pains and penalties, would be applied to for advice and information. In my own case, which I doubt not is the case of thousands, though living in a highly respectable population, and for my own interest avoiding all trenching upon the medical profession, yet I am compelled by the patients themselves (often when medical men are in actual attendance) to recommend simple medicines continually; my refusal to do so would, I am convinced, involve me in a loss of *caste* and of their respect that would be quite fatal to my business. And here I must call attention to that very large class of patients who have spent scores and hundreds of pounds with different medical men, and at last have been fully satisfied and assured that their cases are absolutely incurable, and all that medicine will do for them is simply to give some temporary relief. Now all chemists, I think, must be aware how much we are consulted by this class for some palliatives, or some medicines affording a little mitigation of some particular suffering in such cases. To send these again to medical men would not only be impossible, but in many cases would be deemed deliberate insult; they do not expect any cure, they have paid more than their circumstances warranted in the vain hope, and what they now want is some slight relief for the moment at as little further cost as possible. Ninety out of every hundred chemists are obliged in such cases to act to the best of their judgment without any medical man whatever.

Let it not for a moment be supposed that I am advocating medical practice on the part of chemists; on the contrary, I am convinced it would be to the advantage of chemists generally if there could be some decisive line laid down, over which the chemist was not allowed to pass; but I am equally convinced, and I am sure the immense majority of chemists who have paid any attention to the subject must be also, that any restrictions, pains, and penalties interfering with the sale and recommendation of simple remedies, or preventing patients applying to us for ordinary information respecting them, will be not only oppressive, but will absolutely destroy the possibility of safely conducting our ordinary legitimate business. The proposed Pharmaceutical Bill in no way qualifies us for acting as medical men; its leading idea is to protect the public from incompetent persons, and to raise us from the herd of common dealers into our own proper status as preparers and dispensers of the means of life or death to the public. To make it into a Bill of oppression and penalty will, I hope, ensure its determined opposition by every chemist in the kingdom.

I am, Sir, yours faithfully,

J. B., one of the Founders.

COUNTER PRACTICE.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—If the following letter, taken from one of the medical journals, represented the opinion of the general body, or even a majority of the medical profession, who among the chemists and druggists would not hail the passing of the Bill so corrected as a preliminary to the millennium? Not only those gentlemen whose names stand prominently before the public as the leaders of British Pharmacy, but the greater number of Pharmaceutical Chemists throughout the country are opposed to the principle of counter practice, and would gladly avail themselves of a means of substituting a healthy legitimate business for the hybrid system at present prevailing.

But what proportion of chemists, let me ask, pharmaceutical or otherwise, would be able to maintain their ground and occupy their present position, were counter practice honestly given up without any compensation? What Pharmaceutical Chemist would condescend to dabble in pomades and soaps, perfumery and stationery and the like, if he could get a fair and honest living by the exercise of his proper calling? When the eyes of the medical profession are open to the evils which have arisen to themselves and us since prescriber and compounder were united in one man, and are willing to compensate us for the voluntary and hearty relinquishment of counter practice, by allowing drugs to be compounded by those legally qualified to do so,—in other words, to give up dispensing,—then, and not till then, may we expect the higher and lower branches of the medical profession, the doctor and the druggist, to work together with respect and profit—to the benefits of doctor, druggist, and last, not least, of the public. At present, the druggist gets from the doctor the same reply practically as the doctor formerly got from Ben Jonson, who, when it was remonstrated that the man must live, surlily replied, "he didn't see much necessity for that."

But *until then*, and unless a *quid pro quo* can be obtained, is it not the present duty of the Council of the Pharmaceutical Society to see the saddle fits before it is fastened? I am, Gentlemen, yours obediently,

HENRY CLAYTON.

Eastbourne, May 20, 1865.

"THE CHEMISTS AND DRUGGISTS.—Sir,—One cannot but approve the motion to introduce the clause in the Chemists and Druggists Bill, to exclude all members of the Pharmaceutical Society from the practice of medicine; but ought not the Medical Council to be equally careful to prevent all medical practitioners from dispensing medicines over their own counters, a practice alike prejudicial to the interests of doctor and druggist? Might it not be made compulsory that no general practitioner dispense his own medicines when residing within three miles of a registered chemist and druggist, except in cases of emergency? Contrary to the opinion of some, I maintain the possibility of enforcing both these regulations, provided a recognized fine be attached to a transgression of the statute. Let every medical man communicate to the Central Council all cases evidencing counter practice that may come to his knowledge, the fact being duly substantiated by witness, and the report made within a month of the transaction. No general practitioner would have to wait long before some deluded patient would come confessing that he had had advice from Chemist So-and-so, had taken so much physic, and was no better: this would at once furnish a case in point. No druggist would hold out long against fines rigorously enforced, even if disposed to ignore the requirements of the Bill obtained for the protection of his own class. The case of a medical man continuing his own dispensing, without the necessity arising from distance, would soon become known, and could at once receive due pressure from the executive of our Medical Council. "I am, etc., PERCY LESLIE, M.D.

"*Eastbourne, April 29th*, 1865."

DISTILLATION BY STEAM.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—I should be much obliged if you or any of your readers, having practical experience in a similar case, would give me some advice in the following circumstances:—

I wish to apply a still used for distilling plain water, and having a capacity of about twenty-five gallons, for working a smaller arrangement suitable for distilling about two gallons of cinnamon or other sapid waters; but before having the secondary apparatus made, I should be glad to take the opinion of some one who has already tried the experiment. My idea is to place the ingredients upon perforated trays in a copper cylinder connected with a condensing apparatus, and to cause the steam from the still first mentioned to pass through. The question is, whether the ingredients would be likely to cause condensation to an inconvenient extent within the cylinder, and I should be glad to communicate with any one whose experience would assist me. My places provide sufficiently against condensation from the sides, etc., of the cylinder; but leave some doubt on the other head. Also, I should be glad to learn if this mode effectually exhausts the volatile principles of the ingredients treated.

I am, Gentlemen, yours faithfully,

Clifton, May 24, 1865. RICHARD W. GILES.

UNGUENTUM HYDRARGYRI NITRATIS.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—I am surprised to see in the Pharmaceutical Journal for April an article by Mr. Donovan, in which he states that—

"There is no known formula for preparing citrine ointment, which will always present the same appearance and possess the same properties, and a very short time is adequate to induce changes to a certain amount. This ointment may be viewed as a metallic soap, mixed with that compound which Fourcroy designates oxygenized pomatum. Oxide of mercury, like other metallic oxides, forms a soap with the fatty acids. Berthollet produced such a compound by decomposing corrosive sublimate by means of solution of soap; but it was not permanent, in process of time it became slate-coloured. A soap may be formed of an analogous constitution by heating finely-levigated peroxide of mercury with lard; but the soap thus produced undergoes the same changes as that of Berthollet, first becoming brown, and ultimately slate-coloured. Hence, the ointment of red precipitate cannot be kept unchanged in the apothecary's shop. Citrine ointment is similarly acted upon by time; if its colour be ever so bright a yellow at first, it soon becomes dull, and by degrees tends to the same alterations as those already mentioned."

As this statement is quite contrary to my opinion, based on the experience of its manufacture for ten years, and as Mr. Donovan's experience coincides with that of several of my Pharmaceutic friends, my choice of formula and *modus operandi* may not be uninteresting to some of your readers. With regard to the red precipitate ointment, Mr. Donovan, as also the compilers of the British Pharmacopœia, appears to have entirely overlooked a very excellent recipe published some few years ago in this Journal by Mr. Barber, in which he recommends the substitution of yellow for white wax. I have prepared the ointment in the manner directed by him, and have found no perceptible change in colour during many months.

The formula for citrine ointment I prefer is that of the P. L., 1851, which if strictly adhered to produces a capital ointment, which will retain its yellow colour for a long time. I used a piece a few days ago, which I prepared in the early part of last year, in which there was not a trace of reduced mercury perceptible to the naked eye. I have made the quantity ordered in the London Pharmacopœia, but I generally operate on half that quantity, and as I do not recollect ever having failed in preparing the ointment, my attention was specially called to my method the last time I made it. I tried to call to mind what I did on former occasions, but felt sure I never bestowed very great care upon it.

I took a 6 oz. green flint oval bottle, weighed one ounce of mercury accurately (not a very easy matter to a novice), put it into the bottle, which I took into the open air, measured two ounces of nitric acid, poured it on the quicksilver. I then put some water on a gas furnace to form a water bath, and having weighed the lard and measured the oil, put them into a 2 lb. white pot, and placed the pot in the hot water; directly the lard (common bladder lard, without salt) was melted I went out to get my solution, and found the mercury had disappeared and the liquid still warm. I removed the pot from the water bath, poured in the solution of mercury, and stirred them together with a piece of firewood (deal) for a minute or so. (I did not stir it as if I was making an egg cordial, but more in the manner one is apt to see in the drawing-room after dinner while enjoying those aromatic tipples we so much admire.) I left it and returned in a few minutes, gave it another gentle stir; the well-known effervescence took place, through which I could soon detect the golden tinge. I left it, again returning at short intervals, gave it one or two very slight stirs; when the effervescence had subsided, the ointment was poured into an 8 lb. dispensing-pot and two smaller ones; that is now about a month ago, and it looks beautiful,—it is rather hard, but not much harder, if any, than Unguentum Simplex or Unguentum Zinci, P.B., the consistence of which the compilers of the Pharmacopœia had entirely under their control; nor have I ever noticed any change in colour or consistence during use unless some of my juvenile coadjutors have distinguished themselves by digging a piece out with a steel knife or soiled wooden one; and I do not consider it is any more, if so difficult, to preserve as crystals of nitrate of silver.

One drachm or so of a clear acid liquor I have noticed occasionally on the bottom of the last pot cast, and I have had some fears lest my ointment should be acid or irritating; no complaint however has ever been made, and since the appearance of the British Pharmacopœia, and the use of my sense of taste, I have been contented on that point, as a comparison of the two formulæ will show.

	London.	British.
Mercury . .	2 oz. troy . . .	4 oz. avoirdupois
Nitric Acid .	4 oz. fluid sp.g. 1·42	8 oz. fluid sp.g. 1·5
Lard . . .	12 oz.	15 oz.
Olive Oil . .	8 oz. fluid . . .	32 oz.

The British is very much like the form in the Edinburgh Pharmacopœia.

I have never operated on large quantities of this ointment, but have been told it is much better made on a small scale; if so, there can be no feasible argument against it; it is so easily prepared, requires so little attention that it may safely rank with decoction of senega or a belladonna plaster, with adhesive margin, as one of the slight interruptions one has to submit to in the routine of dispensing business.

With regard to the milder ointment often asked for by the public and prescribed by medical men, the form I like best and always use is one drachm of nitrate of mercury ointment and seven drachms of lard, melted together in a small porcelain dish and cast into a covered pot; a pot has just been given to me by a patient to be refilled, and I find the ointment remaining in it, although diluted two months ago, is in a very fair state of preservation; when a stronger and softer ointment is required, almond oil is a very good substitute for the lard, but my experience with the latter substance is very limited. I prepared a little this morning in the proportions of one part ointment to three parts of almond oil; it is liquid at the present temperature, and although it has been mixed eight hours is still of a nice yellow colour.

The proportions of mercury and nitric acid ordered in the London Pharmacopœia are, I believe, the same as were originally used in the preparation of this ointment, when its reputation as a remedial agent was established; and we cannot be too careful, in endeavouring to improve the formulæ for established remedies, that we do not destroy or lessen their value as a medicine.

I am, Gentlemen, your obedient servant,

George Mee.

8, *Torrington Place, Gordon Square, W.C.*

ON MAGENTA AND ITS DERIVATIVE COLOURS.

BY FREDERICK FIELD, F.R.S.

Three years ago, in this theatre, Dr. Hofmann delivered his celebrated lecture on mauve and magenta; and it might seem temerity in me to trespass upon the premises of so great and distinguished a master, were it not remembered that during that interval rapid strides had been made in organic chemistry, and especially, perhaps, in the direction of the aniline colours.

Although I will endeavour to confine myself as much as possible to the immediate subject of the lecture, it will be necessary to glance for a few moments at the history of aniline, the progenitor of nearly all the beautiful compounds you see around the table.

Aniline was discovered in the year 1826, by Unverdorben, who obtained it from the destructive distillation of indigo. A short time afterwards, Runge and Fritsche observed that by the action of strong hydrate of potash upon the dye, aniline was eliminated in far greater quantity. Indigo in small fragments is heated in a retort with a strong solution of caustic potash, and in the distillate, which consists of many products, there is found a thin and nearly colourless fluid, having a specific gravity of 1·028, a peculiar but not disagreeable odour, and a pungent, biting taste. When kept for some time, even in the dark and in stoppered bottles, it assumes a darker tint, and becomes ultimately a very dark brown. Unverdorben called it "crystalline," Runge "kyonal," and Fritsche "aniline."

This substance is a nitrogenized base, and is capable, when combined with acids, of forming most beautiful crystallized salts, nearly all of which have been carefully examined by Dr. Hofmann and other chemists.

There are many other sources besides indigo, from which aniline may be obtained. For commercial purposes it is always prepared from nitro-benzol, a substance derived from the action of nitric acid upon benzol,—

$$C_6H_6 + NHNO_3 = C_6H_5NO + H_2O.$$

Nitrobenzol, when agitated with water, acetic acid, and iron, yields aniline,—

$$C_6H_5NO_2 + 6H = C_6H_7N + 2H_2O.$$

Benzol, originally discovered by Mr. Faraday in 1825, in his investigations upon the gaseous products from oils, was subsequently obtained by the decomposition of benzoic acid by means of caustic lime. Mr. Mansfield, however, succeeded in producing it in much larger quantities from coal-tar naphtha. When the lighter portions of this compound are distilled fractionally, until a constant boiling-point of 180° F. is arrived at, the product consists of pure benzol, identical with the carbo-hydrogen obtained by Mr. Faraday.

From the earliest discovery of aniline, it was noticed that certain oxidizing agents, when mixed with a solution of its salts, produced a fine violet tint. Even in minute quantities, a few drops of hypochlorate of lime render it purple. There is another test for aniline, which I will show you, and which, as far as I am aware, has not been observed previously. If the red gases obtained by the decomposition of nitric acid by starch or sugar be passed into an aqueous solution of aniline, the liquid speedily assumes a yellow colour, owing to the formation of a new base—azophenylamine—which is gradually precipitated as a bright yellow powder. It was not, however, until the year 1856 that aniline was applied to any great practical purpose, although from the beauty of its compounds and from its comparative accessibility, it had, from the time of its discovery, become a great favourite with chemists.

Mr. Perkin was the first who produced colour on an extensive scale from this base. He added a solution of bichromate of potash to a salt of aniline, and from the precipitate thereby produced, he isolated a magnificent purple dye he termed "mauve," which at once became popular, and, indeed, at the time, almost universal. It may truly be said that this discovery has identified Mr. Perkin with the aniline colours, and that he will be always associated with one of the most striking and brilliant passages in the history of chemistry as applied to the industrial arts.

It cannot be supposed that such a discovery would be allowed to rest. A mine had been opened which chemists began to explore, and in such numbers and with such avidity and zeal as almost to lead us to anticipate that its riches will soon be exhausted.

The action of numerous bodies upon aniline and its homologues was found to be productive of colour. Nitrate of silver, nitrate of mercury, chloride of mercury, chloride of tin, arsenic acid, iodine, and many others, when heated with the base, gave a rich crimson colour in more or less abundance; and although it would be impossible for me to enter into a disquisition on the comparative merits of these various methods for the production of colour, I trust to be able to produce magenta, although in a somewhat crude form, at this lecture table, and also to dye this tassel of silk from a solution of its salt. The reagent I will employ is iodine. A few crystals of this element are placed in a tube with about twice their weight of aniline. Heat is at once developed, and with the assistance of a higher temperature from the spirit-lamp, you will observe that in a few moments intense colour is developed. If a few drops are now poured into spirit, and this solution added to water, a fine rose-coloured tint will appear.

It may seem strange to those who have read Dr. Hofmann's beautiful researches upon the aniline substitution products, his chloraniline, bromaniline, iodaniline, and a multitude of others, that he had not observed this curious reaction; and this leads me to tell you *en passant*, for time will not allow me to dwell upon this interesting topic to-night, that aniline, when perfectly pure, does not yield any amount of colour with most of the reagents mentioned above,—a most important fact discovered by Mr. Nicholson and Dr. Hofmann, and which has given rise to one of the most difficult questions which yet remain to be answered. I will simply say that it appears there must be a homologue of aniline present with that base to produce the colour you see before you, although that homologue *per se* will give no colour whatever.

The tinctorial power of the salts of magenta is something marvellous. No dye that I have examined, whether from the animal, vegetable, or mineral world, can bear comparison for one moment with this crimson colour obtained from aniline. One grain in a million times its weight of water gives a pure red; in ten millions, a rose pink; in twenty millions, a decided blush; and even in fifty millions, with a white screen behind the vessel in which it is dissolved, an evident glow. Perhaps the most startling and graphic incident of this wonderful power is found in an account, which I presume to be authentic, of one of the passages of the 'Great Eastern' from Liverpool to New York, some few years ago, when a hurricane swept over the Atlantic, rendering the mighty vessel powerless amid the mightier sea. After one terrific night, it was observed that far around the vessel the waves seemed tinged as though with blood, faint and diluted in the distance, but deep, and crimson, and terrible in the immediate vicinity, while after every roll of the giant ship gushed forth anew a deep ensanguined flood. When the storm had somewhat abated, and search was made for the origin of this startling phenomenon, it was discovered that some tremendous billow had staved in part of the hold, and at the same time shattered some vessels containing magenta in a most concentrated form, which, sweeping over hatches and through port-holes, did more truly than Banquo's blood on Macbeth's hand, "the multitudinous sea incarnardine."

Although the salts of magenta are possessed of such wonderful colouring power, the base itself is colourless; and it is remarkable that the union of base and acid for the formation of a salt does not appear to take place, in dilute solutions, in the cold. We have here two vessels, one of hot, the other of cold water; an equal quantity of magenta base is added to each, and also an equal amount of dilute sulphuric acid. You will observe that in the hot solution colour is instantaneously developed, while in the cold there is no change; but if hot water be added to the latter, so as to raise the temperature, the colour at once becomes apparent. You may judge, therefore, that, having free acid in a solution of base without production of colour, it is possible to have free alkali in a coloured solution of a salt of the base without destroying its tint. Such is the case: to these two solutions of acetate of magenta, one hot and the other cold, are added equal quantities of caustic soda; the hot liquid is rendered colourless, the cold retains its original hue.

Ethyl-rosaniline, a substitution product of rosaniline, discovered by Dr. Hofmann, and which gives a most beautiful shade of violet when in solution, is capable of affording most remarkable manifestations. This dark, violet liquid, on the addition of sulphuric acid, becomes colourless; on adding ammonia the purple is restored. If hydrochloric acid is employed in small quantities, the liquid changes to blue; if in larger quantities, to a brilliant green; but if this green liquid be thrown into water, you will observe that the original violet returns.

When aniline is heated with salts of rosaniline, purple and blue compounds are produced. The blue is perfectly insoluble in water, but soluble in alcohol, and its solution thrown in water imparts a brilliant tint, although probably the dye is only in a most minute state of division. If a tassel of wool or of silk be plunged into this liquid, you will observe that the colour disappears from the bath, and the fabric becomes dyed; it has acted like a sponge, or perhaps, more properly speaking, like a filter, arresting in its passage through the water, the finely disseminated particles. Mr. Nicholson patented a method for obtaining a beautiful blue dye soluble in water, which consisted in heating the phenyl blue with strong sulphuric acid. This compound, however, though most advantageous for silks, refuses to impart its colour to wool, and we have before us the curious phenomena of wool and silk in the same vessel, the one of a bright azure tint, the other perfectly untouched. The effect is still more striking upon cotton. We have here the letters "R. I.," in honour of the Royal Institution, worked in silk upon a cotton ground; after dipping it for a few moments in this bath, you will see that the letters are blue and the cotton is unchanged.

There is another colour I must mention, aniline green, produced by the action of aldehyde upon acid solutions of rosaniline. This is one of the most charming colours yet discovered; the green is perfect, and you have only to compare the artificial greens made by the mixtures of blues and yellows with this extraordinary dye, to see the wonderful difference they present.

I have prepared a little conceit here, which may be called puerile by some, yet which I cannot help feeling is full of instruction. You are aware that the base magenta or rosaniline is colourless. Such is the case with the majority of the aniline colours. We were taught in the catechisms of childhood that there are seven primitive colors—violet, indigo, blue, green, yellow, orange, and red.

Aniline consists of seven letters, and up to the present time we have from this wonderful base obtained seven colours. On this white board the letters of aniline are written in the colourless bases, and if our experiment succeed, you will find that upon sprinkling the board with acetic acid and spirit, the A will be violet, the N indigo, the I blue, the L green, the I yellow, the N orange, and the E red, making aniline speak to us in the language of its gorgeous offspring.

I am indebted to my kind friends Messrs. Simpson, Maule, and Nicholson, for the beautiful specimens of dye, many of a most costly and magnificent description, which you see before you; and to Messrs. Hands, Son, and Co., of Coventry, for the splendid array of silks so kindly furnished me to illustrate my lecture.—*Chemical Times.*

CORK AND ITS USES.

BY JOHN R. JACKSON.

Amongst the many materials or productions in use in everyday life, cork may certainly take a position in the foremost rank. We all know something of cork; from our earliest childhood we have been familiar with it. It is a substance that has retained all its ancient uses, as well as its importance and value, from its earliest history down to our own day. Unlike most other things, it has not, even in this age of application and invention, found a rival. True it is we have "corky" substances in abundance, produced in almost every country; but neither the productions of nature nor the productions of mechanical skill have produced an efficient substitute for cork, one that could take the place of this valuable bark, or even go side by side with it.

Considering the great quantity of cork that is consumed even in this country alone, as well as the great amount that is wasted, the quantity of bark annually stripped in the cork-forests is an operation of no little importance. The slight value many individuals place upon cork, on the whole, does not lead us in the least degree to estimate its real importance, which, in a commercial point of view, is of no trifling nature.

There must needs be a large quantity imported; for amongst wine merchants, bottled-beer merchants, or soda-water makers, a cork is never used a second time: but then what an immense bulk would go to make up a ton of cork, and yet it is by weight that the imports are estimated. There is an immense consumption, and the demand of late years has almost exceeded the supply. The annual quantity imported into this country averages about 5000 tons.

Of the early history of cork, it is very clear that it was well known and in use amongst the Greeks and Romans. Theophrastus distinctly alludes to the fact, now so well known, that the continual barking of the trees tends to improve the quality of the cork. With the Greeks it was called "Phenos," while the Romans knew it by its present specific name of "Suber." Though cork was probably used in very remote times for similar purposes to those of the present day—that of stoppers for bottles, amongst the rest—this, however, does not seem to have been its common or general use, inasmuch as we find that vessels of that period were frequently closed by earth, clay, and other similar substances. Stoppers of cork, or "corks," as we now call them, appear not to have been generally introduced till some time in the latter part of the sixteenth century; from that period, however, its use has been getting more and more universal in all parts of the world.

Before the introduction of cork, or its general adoption for bottle-stoppers, various articles were resorted to for this purpose. We are told that apothecaries secured the contents of their phials with stoppers made of wax, which must have been a somewhat tedious process. But even in our own day, a similar custom prevails in many parts of Europe; for with many of the Italians, and Neapolitans for instance, the practice of securing their wines, by pouring oil into the mouth of the bottle before tying it down with skin, is still very prevalent.

Before entering into the uses of cork, however, let us pay a short visit to the forests from whence it is obtained, and trace its progress from its natural position to that of its ultimate application.

Cork, as we all know, is the bark of a tree, though commercially miscalled "cork-wood." It is produced by two species of oak, *Quercus Suber*, L., and *Quercus occidentalis*, hence called the "cork-oaks." These trees grow abundantly in large forests in Spain, Italy, the South of France, and Northern Africa, the latter species being found alone on the Atlantic side. This species is also peculiar, from the fact that it ripens its acorns in the second year.

In general appearance, the cork-oaks differ little from the common oak, except, perhaps, that they do not attain to so large a size. There is also a slight difference in the form of their leaves—those of *Quercus suber*, L., being more lanceolate, and the margins not so deeply sinuate; the acorns are also somewhat longer and more tapering in form than those of the common oak.

The cork-oak does not require a rich soil; but, on the contrary, it seems to thrive best in poor and uncultivated ground. To collect the cork, incisions are made longitudinally and transversely in the bark of the living tree, the instrument used being a kind of axe, the handle of which terminates in a wedge-shaped form. After the bark is cut through, it is beaten to loosen it from the liber or inner bark, the wedge-shaped axe-handle being inserted to lift the bark from the trunk. The cork thus removed usually varies from three-quarters of an inch to three inches in thickness. The next operation is to divide it into pieces of a uniform or convenient size, and to flatten it, each piece having, of course, a similar curve, corresponding with the trunk of the tree from whence it was taken. For this purpose, the pieces are placed in pits and covered with water, and then pressed flat with heavy stones. The well-known charred surface upon these cork slabs is caused by the application of heat at an open fire, after the steeping, for the purpose of contracting the pores. The pieces are afterwards bound up in bales, in which form they appear in the market. In removing the cork from its paternal trunk, care has to be taken not to injure the inner bark next the wood, else it would affect the second crop of bark, and perhaps injure the tree. This operation of stripping the bark, if dexterously and carefully performed, has, as we have already said, no detrimental effect, either upon the growth of the tree or the rapid formation of the new bark; but, on the contrary, the tree is said to grow more hardy and vigorously. The first crop of bark is usually taken when the tree is about twenty-five or thirty years old, but the crop is of less value than that of any succeeding gathering, as it is harder, very uneven, and more full of holes. The second gathering, however, which is in about eight or ten years after the first, is still of an inferior quality. The third crop, collected in about eight years after the second, is usually the first marketable cork—that is, the first crop that is fit for cutting into bottle-corks. When the trees have attained to this age, so that three crops have been taken off, they usually yield a supply of good cork about every seven or eight years; and its quality improves, as well as the quantity enlarging, at each successive gathering. The season chosen for the cork harvest is usually the month of July or August.

It will be seen by the foregoing that the quality, and consequently the commercial value of cork is materially affected by soil, length of time allowed in growing, and also of care in collecting. There is as much difference existing in the quality of cork as in most other articles of daily use. The finest kind should be compact and firm, but at the same time not hard, of an even texture or grain, and of a slightly pinkish tint. This kind of cork is generally selected by wine merchants for bottle-corks; while the coarser kind, which is always more porous, full of small holes, and perhaps punctured by insects, serves for bungs for casks and for the various other applications to which cork is put in a cheap form. When cork is required to be thick, it is usually found coarse, as it must be allowed a longer period of growth to promote its thickness. The charring or singeing process to which this kind of bark is frequently subjected, for the purpose of filling up the pores and making it impervious to fluids, has also a detrimental effect, as it secretes an empyreumatic oil, which is given off and frequently taken up by the liquids it confines; but there is no doubt that care is taken in the selection of these corks, and methods adopted for the prevention of this chemical contamination, as much as possible. This operation of charring, to which all cork was formerly subjected for the purposes we have just mentioned, has been partially succeeded of late by that of boiling the cork and afterwards scraping the surface. This is said to improve rather than to deteriorate the cork, in being more effectual in filling up the pores.

The uses of cork are so numerous, and its applications so continually increasing, that the supply of late, as we have said before, has not been sufficient to meet the demand. It is not our intention to enumerate all the uses to which this most useful article is put —indeed, it would be unnecessary to do so, so well known as they are to all; but there are a few modern uses or applications to which cork has been found suited in recent inventions, and which are perhaps among the "things not generally known;" but these uses chiefly consume waste or refuse cork, such cuttings as were formerly considered of no value.

The new elastic floor-cloth, now so well known as "Kamptulicon," is a combination of caoutchouc and cork; and this is but one instance showing that cork, treated with other substances, can be made into a really useful article. Cork-dust has been used successfully with india-rubber in the process of vulcanizing, and to so fine a powder is it reduced for this purpose, that india-rubber so treated is capable of being moulded into the most delicate forms. Another recent application of cork is for stuffing beds, and we believe this is now done to a large extent.

A large Cork Company, lately established in London, and owning large forests in Portugal, have recently imported the virgin cork into this country, with the impression of its becoming useful for rustic garden-work. It is brought in very large pieces, and, from its rugged, uneven surface, which is frequently covered with lichens, together with its portability and its porous nature, which makes it capable of retaining moisture, will no doubt cause it to be used for such purposes.

Though the bark of the cork-tree contains a considerable amount of tannin, it is not in general favour among tanners, on account of its not imparting the required "bloom;" and for this reason it is seldom used alone, but is mixed with English oak bark. The inner bark is that which is used for tanning purposes, the outer bark being quite devoid of any of the required properties. The removal of the inner bark causes the death of the tree; and it is chiefly from Sardinia and some parts of Spain, where the trees are very abundant, that it is imported for this purpose. The quantity of tannin, as well as the colour of the bark, varies much, according to the district from whence it is obtained. The Sardinian bark is thicker and of a deeper red colour than any other.

To return to cork itself and its more common applications, we find that there are two sorts or qualities known in commerce, called respectively white and black cork. The white, which is chiefly produced in the south of France, is the best, as it is smoother, of a more even and finer grain, and freer from holes and knots.

The operation of cork-cutting is one requiring great dexterity and neatness, and is carried on to a great extent both in France and England, though, as might be supposed, the French surpass the English in this art. Machinery has been tried for the purpose of cork-cutting, but all is now cut by hand. Considering the difficulty, with which we are all acquainted, of cutting a clean surface to cork, it is surprising to see the rapidity with which the workman turns out a perfect cork stopper from the little square pieces furnished to him. The knife used for this purpose has necessarily to be very sharp, as well as being very thin; the blade is broad, and when the edge has become dull, it is quickly sharpened on a very fine-grained stone. The bench or tube at which the workman sits has a ledge round it to prevent the corks falling off. On the Continent, a notch is made in the edge of the bench to place the back of the knife in, to prevent it from slipping. Thus the edge is uppermost, and the knife has to be guided slightly while the cork is pressed against the edge, and so dexterously turned and rounded to the required form. All the corks thus cut are thrown into a basket to be sorted, which is usually done by women and boys.

The great importance of cork as a commercial article has been the cause of experiments being tried for its introduction into the Southern States of North America. It is, however, some years since the American Government tried this plan of naturalization, for which purpose large quantities of the acorns were imported from the South of Europe. More recently, we learn, from Sir J. W. Hooker's last Report on the Royal Gardens, Kew, that steps are now being taken by the Colonial Government of South Australia to introduce the cork-tree, and a number of young plants have been raised at Kew expressly for transmission to that colony.

We sincerely hope that these efforts to establish a tree furnishing so useful a product as cork, in a colony where it would become a valuable addition to its commerce,—as well as adding to the supply, which, at the present increasing rate of consumption, is much to be desired,—may be crowned with success.—*The Technologist.*

THE PHARMACEUTIST AS A MERCHANT.

BY FREDERICK STEARNS.

That which constitutes "commercial education" in relation to the pursuit of all usual forms of business, is capable of being applied to the Pharmaceutist, there being, however, special points relating to each, and those, whatever they may be, it is presumed are the ones to be touched upon in any essay upon commercial education in relation to the successful pursuit of the pharmaceutic art.

Taking it for granted that the novice has acquired during his minority a fair share of the "King's English," has even graduated at a school of pharmacy during his apprenticeship, then the following remarks may be usefully applied:—

Commercial education, or the knowledge of those methods of conducting business by means of which pecuniary success and an honourable position in community are obtained, is, of course, the fruit of experience only in the vast majority of instances.

The social position of the Pharmaceutist, in our country at least, is fully equal to that of those following successfully other channels of trade. Its pursuit implies a cultivated mind and scientific tastes, and as we acknowledge no aristocracy but that of mind, the necessary qualification of professional skill in our art ennobles it.

It is of primary importance that the beginner should enter upon the pursuit of pharmacy enthusiastic, earnest, and with unbounded ambition to succeed and excel; to be in love with it, and with a firm determination to let no trivial disappointments turn him from his course.

I believe it true that the discouragements are greater to the beginner in pharmacy as a business, than in many other pursuits, because the demand for the products of our skill is limited in comparison with that for most great staples of trade which busy the business talents of the mass of our fellow-men; moreover, a community take to a new Pharmaceutist shyly and slowly, confiding in him only as they come to know him.

Choose, then, pharmacy as a business in the profound conviction that you were born for it, and not take it up on trial to be thrown aside for some other. Are you hopeful? So much the happier will you be, for anticipation of success is about equal to its reality.

Don't try and stand alone until you have reaped the benefit of an apprenticeship with some experienced and successful preceptor, during which you have enriched your mind by reading, study, and schooling in pharmacy, and acquired those business ways and habits which have led him, whose example you study, to success. This preliminary education is of such vital importance that the want of it can never be compensated by the slowly accumulated experience of an active life of years. I know of many young men who, after a stay of one or two years in a subordinate position in a drug store, have started in business full fledged, in their own belief, as capable and experienced Pharmaceutists; such gravitate naturally to the position in which they properly belong among merchants, remain incapable and become obscure.

We all know this *hasty* tendency is peculiar to American youth; ambitious to reach the goal of future hopes, it leaves the formation of correct business habits to the chance of coming years; this it is that crowds our cities and towns with so many ignorant druggists—men who pick up the business of pharmacy as they would that of selling Yankee notions, live and succeed in a small way, or fail ingloriously; in either event, blissfully ignorant of the capabilities of the art in whose borders they have to tread.

After a varied experience of twenty years in pharmacy, I am possessed of the strongest conviction that a rigid adherence to principles of integrity, to honour, and to truth, in conducting our business, is most surely conducive to its success; therefore, business *policy* should dictate such conduct, aside from moral conviction.

We all know a thousand *tricks* in trade, the prevarication, the exaggeration, and other nameless ways of making things appear as they are not, and which so often overshoot the mark, till it is a common thing for the community to allow an ample margin on almost everything that comes from a drug store, between semblance and reality, utterance and truth. This is not as it should be; for truthfulness, in all our ways, is the best business policy, as it is most satisfactory to the conscience.

Now, supposing our beginner to be possessed with a fair education, moral, ethical, and scientific, but no experience as a business man, what points are there to be observed in trade that will be most likely to lead to pecuniary success?

There are many, of small importance singly, but in the aggregate help to swell the tide that leads on to fortune.

The Pharmaceutist as a merchant *must be* industrious; the details of the business are so numerous as to tax, almost to its utmost, his endurance and patience.

When the aggregate yearly business is any considerable sum from the retail sales of medicines and accessories, the details to accomplish that require a vast number of steps and much labour of hand and brain; so it becomes a fixed fact that there is no moment, in a well-organized business, that there is not something to do; there *are* no leisure hours.

This industry must be *personal*, too, in a proprietor, to be seconded by his assistants; this industry also implies a personal eye to all the details of a business, consequently there can be little leisure for outside occupations; better do one business well than trust to the chances of success in two or three at once, none properly conducted.

What is termed business *tact*, as it may be applied to our art, consists in knowing, as it were intuitively, how to win friends and draw customers around you.

It is shown in a proper selection of a business stand. Had I the choice between a good stand with little means to expend in fixtures, and an indifferent one with rich fixtures, I should choose the former, trusting to the future to make up the last want.

It is shown in the fittings of a store; rich without extravagance, or plain with neatness, either may be elegant. Convenience and appliances which favour the *rapid* dispatch of business, should not be overlooked as a saving of help and labour, and consequently a means of profit.

Tact is particularly shown in a courteous bearing towards customers, implying an appreciative sense of their patronage, with a self-possession and manly self-respect that is above fawning or flattering. Here it is that an intelligent understanding, or knowledge of the goods in which we deal—their history, their merits, their qualities, their peculiarities—is of such great assistance in our business in making sales. If you possess the ability (and you should possess the will) to explain to the customer, with curiosity excited, that which he seeks to know, or to impart that which you have led him to desire to know, and you do it in a self-confident yet truthful way, it is always a great point gained; that customer will always respect your intelligence; his opinions in all that relate to the art will be moulded by your own, and he will be sure to be your regular patron.

I believe in stating the merits of an article decidedly and truthfully; good goods tell no after-tales of deceit; poor ones, well puffed, most surely will.

Business tact is shown in treating your clerks as if they were friends, and so making hem such. Kind words and even temper are consistent with a sufficiently rigid discipline; remember, that the example by word and deed of a proprietor will produce lasting effects on the impressible characters of your young apprentices, bearing fruit in future habits and business ways.

Business tact is shown again in keeping pace with the age in which you live—to be ready with all the innovations, novelties, and sensations in the medical world—experimentally, of course, at first; and, while you do not endorse such necessarily by your own approval, you should be ready to supply them.

It is shown in the careful selection of the stock of goods, particularly where means are limited, watching the demand so as to apportion it correctly, so that no overplus of some items may lessen your ability to keep a full assortment of goods.

It is shown in guiding the market yourself, not letting it guide you; strive to lead the *tastes* of your customers towards those kinds or qualities of goods which you know to be best for them, better than they themselves do. I hold this to be a duty which none of us should be indifferent to.

Business tact is shown in so individualizing your business that everywhere possible the articles sold by you should represent *you*, not some one else; make everything yourself that it is at all practicable for you to make, and if your skill is such that whatever you make represents the best of like articles, then each item of such sold is a standing advertisement for you to win additional trade. I am a firm advocate of the practice of each pharmacy being a producing one; it is no credit to a man, who has been well educated in this art, to be contented to live long and sell only the products of others' industry, when he might better make his own, increasing his business and reaping the additional portion of profit thereby.

Business tact so displays goods as to make the most of them, so in a measure to help them sell themselves; therein neatness and taste go hand in hand with industry.

While business tact will lead the merchant, desiring success, to deal in all the articles of his line that the public calls for, there are in ours very many things that, which to do, is more or less to compromise with the right and wink at the wrong,—the alcoholic stimulants under the guise of medicated bitters; the regulating remedies, so advertised as to furnish a ready means for criminal purposes; add to these almost the whole list of the so-called patent medicines: all these the intelligent pharmaceutist knows are pernicious in their effects upon the public health, and yet how feeble are his efforts to retard their sale, how weak his protest against their use. If you do deal in such, be independent enough to make the sales of them depend upon the natural law of *demand*, and *not* on your efforts; do not, above all things, ever endorse them with breath of praise.

About advertising, that is also a legitimate means of making yourself known, but how best to do it to reap the largest returns for the smallest proportionate outlay is an art in itself, and one that each must learn by himself.

After all said about business tact, business success will be dependent upon keeping and selling those qualities of goods, in every department of your trade, that are intrinsically good, and he who takes, in that respect, the highest stand will reap the greatest reward.

The greatest *reward* lies not only in money gains, but in reaching that honourable position in community wherein you are looked upon as a public benefactor,—in seeking honest profits and not being a Shylock. It gladdens me to remember professional friends who are poor, perhaps, in pocket, but rich in possessing the respect and affection of their neighbours, while my mind's eye rests on an occasional one who is poor in everything that can make a man *poor*.

The economical administration of business affairs will commend itself to all who mean to win success; and, while a commendable share of enterprise is to be advised, a proper mixture of caution is quite as valuable.

Men of scientific tastes are not apt to be good financiers; such tastes render them careless of money; they rarely understand economy in business, and in business they trust their finances to others not vitally interested. The pharmaceutist should know at all times how he stands in credit and purse; "cutting your coat according to your cloth," and the host of similar commercial maxims, commend themselves forcibly to his attention.

Great is the field for the inventive faculties to play in pursuit of pharmacy—devising improvements in formulæ, shortening methods, improving apparatus, introducing new, unique and original designs in labels, bottles, and various similar things. Don't be a mere copyist of others, but add something, during a lifetime, to the sum total of taste and improvement.

It is surprising how the little elegances, and nice nothings, aid the business of the prosperous and enterprising pharmaceutist.

Professional men are not given to business-promptness; don't let the title of *professional*, which is attached to our art, lead to any such careless habit as a want of promptness in fulfilling any and every promise to do or promise to pay.

So varying and peculiar are the auspices under which each young man enters business, that it is not likely that the foregoing covers all the ground designed for a reply to the query I accepted; these several points, however, may, if acted upon, be conducive to a proper estimate in the minds of some of the right paths to follow in acquiring a commercial education.—*Proceedings of the American Pharmaceutical Association*, 1865.

NOTE ON CARAMANIA GUM.

BY WILLIAM PROCTER, JUN.

Whilst engaged in the revision of the U. S. Dispensatory, Dr. Wood was presented by Mr. Benjamin R. Smith, of Philadelphia, with a sample of gum from a large invoice under the name of "Caramania Gum." No account of its origin could be given by Mr. Smith; but there can be little doubt that it is the same gum described by Mr. S. H. Maltass (Pharm. Journ., vol. xv. p. 20), as one of the gums used habitually to adulterate tragacanth. Mr. Maltass states that this gum is employed, to the extent of 50 per cent., to adulterate the commoner varieties of tragacanth; and to render the cheat less perceptible, is sometimes whitened by the addition of white-lead. Mr. Hanbury (*ibid.* p. 21), in a note, states that the Caramania gum appears identical with the "*Gomme pseudo-adragante*" of M. Guibourt, regarded by that author as the product of *Astragalus gummifer*, Labill.; but it is referred by report, says Mr. Maltass, to the wild almond, a plum of Caramania.

The "Caramania gum" occurs in pieces, varying in size from a pea to a large chestnut, with a greater tendency to the spherical than tragacanth, though sometimes with a tendency to the contorted vermicular form, so common in tragacanth. Its colour varies from light to reddish-brown, more or less translucent, nearly tasteless, and slowly absorbing moisture when placed in water, swelling up to bulky, hydrated, jelly-like masses; whilst the intermediate spaces are filled with a mucilaginous solution of the more soluble part of the gum, but the soluble portion is evidently less abundant than in tragacanth. The mucilage is precipitated by subacetate of lead, but less decidedly than is arabin; oxalate of ammonia causes a white precipitate, not very abundant; alcohol does not instantaneously precipitate it in flakes like arabin, apparently because of a greater resistance of the mucilage to be penetrated by that liquid. It is not coagulated by borax, or sesquichloride of iron. The gelatinous insoluble part has but little cohesive power at first, but by standing, it softens and becomes more paste-like. When boiled with dilute sulphuric acid, it loses its jelly form and assumes a syrupy condition, being converted partially into soluble gum and partially into glucose, as indicated by Trommer's test. A solution of oxide of copper in potassa instantly precipitates both this and the soluble gum as a bulky bluish hydrate. Dr. Wood considers Caramania gum to have the same origin as the gum of Bassora, and that probably both are produced in the province of Caramania, in Asia Minor—the latter entering commerce by the Persian Gulf, whilst the former comes to Smyrna, to be used as an adulterating agent.—*American Journal of Pharmacy.*

NEW PROCESS FOR MAKING FLUID EXTRACTS.

This invention relates to an improved process for producing that class of extracts which are made so that a certain amount of liquid shall represent, pound for pound, medically, the same quantity of crude drug, and which are generally obtained by extracting with a large excess of liquid and evaporating down to the desired strength. The menstrua used for making extracts are usually of an ethereal or volatile nature, such as alcohol of various strengths, and their strength changes by evaporation, as they are exposed for a longer or shorter period to the open atmosphere. If such menstruum is poured over a certain drug, it dissolves and extracts more or less of the soluble parts of the same, according to its strength; but if the same liquid has to be poured repeatedly over the same drug it loses its strength alcoholically, and some of those portions first dissolved are precipitated, and an imperfect extract is the result. The value of the extract being determined by its alcoholic strength when finished, the same or similar reasons render it objectionable to subject the extract when first obtained to the evaporating process, for by this process the volatile or spirituous part of the menstruum is first evaporated, and the weaker liquid is not capable of keeping in solution many of those parts of the drug which had originally been dissolved in the extract.

These objections are obviated by my process, which is carried out in the following manner:—I first weigh off a quantity of drug, and the same quantity or more by weight of the menstruum or liquid by means of which the extract is to be made, a little more of the menstruum being required as a little moisture is left in at the last pressing. The drug being ground to a proper fineness, is then dampened with a small portion of the liquid and subjected to heavy pressure (say from 800 to 1000 tons); already all the liquid, or nearly so, together with such parts of the drug which have dissolved in the same, is expressed. A fresh portion of the liquid is then sprinkled over the drug, a little time being allowed for the liquid to dissolve the soluble parts of the drug, and the same process of pressing repeated until the whole quantity of the liquid is used up, and the drug is completely exhausted and the required measure obtained. By this process an extract is obtained which represents, pound by pound, the crude drug. The drug is perfectly extracted, and the menstruum preserves its original strength throughout, so that the same is capable of retaining in solution all those parts which are dissolved during the various stages of the process. Furthermore, by my process the tedious and expensive process by evaporation is dispensed with, and concentrated fluid extracts of any description can be produced cheaper and better than by any process heretofore applied and as the application of heat is entirely avoided, the preparation does not receive the injury by heat that all such preparations are liable to if heat is applied to them, no matter how carefully done or moderate the degree of temperature, and furthermore, the changes thereby of strength of solvent are avoided. (From United States Patent, taken out by Mr. Spencer Thomas.)—*Medical Press.*

GULLIBILITY OF THE PUBLIC.

A Pharmacien of Paris has lately introduced a *spécialité*, which under the name of *Oleo-morrhuine*, and a label ambiguously worded, purports to supply the public with Cod Liver Oil in the form of a *colourless, saccharine powder*, declared to be more efficacious than all the Cod Liver Oil of commerce, as already proved by long experience! Notwithstanding its manifest absurdity, this powder (which is entirely devoid of the taste and smell of Cod Liver Oil) finds eager purchasers, and is even prescribed by medical men. It is sold in little boxes at the modest price of 3½ and 6 francs each!

THE FATAL EXPLOSION IN MAKING OXYGEN GAS.

Evan Griffiths Hughes, chemist and druggist, Cateaton Street, Manchester, surrendered bail, on an indictment of manslaughter. Mr. Holker and Mr. Pope were for the prosecution; Mr. Serjeant Simon and Mr. Kay for the defence. According to Mr. Holker's opening, the charge against the prisoner was that he sold an adulterated mixture of manganese and carbon, which produced a fatal explosion. The prosecution aimed to bring home to Mr. Hughes, either that he himself adulterated the manganese, or that he sold it knowing it to have been adulterated. Manganese, mixed with chlorate of potash, was used by chemists and others in the manufacture of oxygen gas. These substances had to be mixed in certain proportions, in a retort. If the manganese was not pure, or was adulterated with carbon, the whole mixture became a chemical substance almost as explosive as gunpowder. On the 17th of December, Mr. Morgan, an optician in Market Place, wishing to prepare a quantity of oxygen gas for some exhibition in the evening, and having exhausted his own materials, sent his boy to Mr. Hughes's shop for 3 lb. of manganese, and 7 lb. of chlorate of potash, that being the usual proportion. The lad went to Mr. Hughes's shop, and was told to come again; he did so, and was then given two parcels, one containing the 3 lb. of manganese, the other 6 lb. of chlorate of potash, there being no more in stock. Mr. Morgan, in preparing to make the gas, used some of the manganese, and laid the rest aside. He put this mixture into the retort, and put it upon the fire, and in a very short time there was a loud and heavy explosion, which knocked him down. Thinking the fault was in the retort, Mr. Morgan sent his boy with some of the manganese to Samuel Crowther's (who was in the habit of making oxygen gas for the theatres), to ask him to make him some gas; and on the way the boy, by his master's directions, got an additional pound of manganese at Mr. Mottershead's. While Mr. Crowther was heating the retort in which was the mixture Mr. Morgan had got from Mr. Hughes's, an explosion took place, which partly blew the house down, and caused Crowther's death under circumstances with which the public are no doubt familiar. The jury would now have to inquire whether this man's death was caused by the explosion of manganese purchased at Mr. Hughes's; and whether Mr. Hughes adulterated it, or sold it knowing it was so. On the Monday (the explosion occurring on a Saturday), a policeman went to Mr. Hughes's shop, and asked for a portion of the same material as had been supplied to Mr. Morgan. A parcel was given to the policeman from the partly-filled drawer out of which Mr. Morgan had been supplied on the Saturday. This was subsequently analysed by Professor Roscoe, of Owens College, and found to be quite pure. That procured from Mr. Mottershead he also found pure. After the inquest, the scrapings of the drawer at Mr. Hughes's were analysed, and found to be nearly as adulterated and therefore explosive as that found on Crowther's premises after the accident, and which contained 30½ per cent. of pure manganese, and about 26 per cent. of carbon; but the portion kept by Mr. Morgan from the same parcel contained 30 per cent. of manganese and about 19 per cent. of carbon, the carbon being the cause of adulteration and explosion. A portion of the manganese kept in Mr. Hughes's reserve canister in another part of his shop, and from which the drawer was filled when empty, consisted of 54 per cent. of manganese and about 5 per cent. of carbon. The suggestion offered by the prosecution upon these facts was that Mr. Hughes adulterated the manganese with carbon, and that, hearing of the explosion, he replaced the contents of the drawer with pure manganese before the police visited him. There was a little additional evidence to that given before the coroner from whose court Mr. Hughes was committed, and the material points it contained were, first, that the Rev. Mr. Lumsden, congregational minister at Cheadle, on the 2nd December, purchased some manganese (proved by analysis to be slightly adulterated) at Mr. Hughes's, and that it slightly exploded when placed over the fire; secondly, that adulterated articles were found adhering to the bottom of Mr. Hughes's drawer, as referred to by the learned counsel in his statement; and, thirdly, that the explosions at both Mr. Morgan's and the deceased's brought down quantities of soot, which covered the floor and furniture, and might possibly have got into the bags containing the manganese, soot being possibly the form of carbon in which consisted the adulteration. Some of these facts were brought out by Serjeant Simon in his cross-examination. The learned serjeant, in fact, founded a brief speech in defence upon them, and ridiculed the idea that a respectable tradesman like Mr. Hughes should, for the paltry gain of a few pence, deceive his customers, cause lives to be risked, and endanger his own reputation. The jury said they would not trouble the learned judge to sum up the evidence, but his lordship thought it would be more satisfactory to do so. He therefore pointed out the main features of the case, but did not read through the whole of the evidence, that being in his opinion quite unnecessary. The jury immediately acquitted the prisoner, and the foreman's "Not guilty" was followed by loud applause, which penetrated to the other parts of the building, and communicated the news of Mr. Hughes's acquittal to his many friends who were "waiting for the verdict." The learned judge lectured the spectators upon the impropriety of their demonstration, which he said he strongly condemned, because, although the friends of the prisoner had a right to rejoice out of court, there ought never to be any cheering in a court of justice before the judge and jury. Mr. Hughes left the court escorted by a large number of his acquaintances.

PHARMACY IN AUSTRALIA.

Mr. Whitfield, of Scarborough, sends the following letter taken from the 'Melbourne Medical and Surgical Review,' as showing the condition of pharmacy in that colony:—

Sir,—The curious rodomontade by "Chemist" in your last issue, requires an answer, and perhaps he will take it with a better grace from a "brother chip" than from one of the faculty, for which he professes such deep "disgust."

The burden of his complaint is as follows:—"The profession make a point of sending their prescriptions to a particular chemist." It certainly is the case to a limited extent; but if we consider the present state of pharmacy in the colony, the wonder is that the custom is not more general. I will here give two or three cases in point.

Within the last fortnight, a gentleman who had a mixture repeatedly prepared by us, had occasion to have it made elsewhere; he brought it to the writer next morning, and asked what was wrong with it, as it differed in taste and colour from what he had before taken; on examination, the principal ingredient (Tr. Cubebæ) was found absent: the name on the bottle was that of a "respectable chemist." The next case occurred four or five weeks ago, and is as follows:—A chemist ("a respectable one") inquired the price of Liq. Bismuthi, and observed in a cool, off-hand manner that it had been ordered in several prescriptions which he had dispensed, but he had omitted it, not having the preparation in stock. I had been conversing with a medical gentleman a short time before this occurrence, when he told me he had prescribed Liq. Bismuthi, but *without effect*. This is precisely what might have been expected, if the prescription had been prepared by the last-mentioned individual. Another case occurred, which is perhaps more to the point than either of the preceding. This time, a "respectable chemist" substituted Pulv. Antim. Tart. for Pulv. Antimonialis. I am satisfied that it arose from ignorance, and not carelessness, as he was not brought up to the trade.

After the above remarks, it will be obvious that the profession is fully justified if it inquires of its patients where they obtain their medicine, and advising accordingly.

Your strictures on "Chemist's" next paragraph render it unnecessary for me to notice it. The rest of the letter is, however, very funny; he threatens medical men, if they continue to "disgust" him (which means if they do not send their prescriptions to his shop) with the united vengeance of the trade. It is to be regretted that he did not inform his intended victims how it would take effect. Next come some allusions to American M.D.'s, with whom he ranks Drake, Brandreth, and others: I presume he will do the same for Mr. L. L. S., who is the proprietor of certain pills of vegetable origin and of wondrous efficacy. Lastly, I am at a loss to perceive the connection between "hyperbolic(*al*) language and dog-Latin" with the "skilful operating surgeon or clever obstetric(*ian*)."

Having proved that pharmacy in this colony is not in a satisfactory condition, it is my duty to propose a remedy, and I commend it to the earnest consideration of the profession and trade. The remedy consists of an Act of Parliament to the following effect:—

1st. That all chemists in business do register themselves before some fixed date.

2nd. After that date, all chemists not registered, and all chemists' assistants that wish to register, do pass an examination, which shall be (to commence with) plain and practical.

3rd. The Board of Examiners to be appointed, say, by the Governor in Council, and to consist of equal numbers of medical men and registered chemists.

4th. All registered chemists to pay an annual subscription, say, of 20*s*. The funds thus raised to be devoted to the prosecution of any infringing the rights of registered chemists, and to the general advancement of the interests of the trade.

The word chemist as used above only refers to *dispensing* chemists.

These suggestions I am aware are very crude and incomplete, yet I believe that if some similar regulations were in force, medical men would not "disgust" "Chemist" by sending their "prescriptions to a particular shop," for they would then have a guarantee that all in the trade were at least tolerably proficient. I would also strongly advise him to lend a hand thus to reform our own body, instead of so coarsely abusing the profession, whose only fault is that of protecting the public from the effect of cheap and therefore adulterated drugs, and from garrulous and therefore untrustworthy chemists.

MAGNESIUM.

Mr. J. N. Hearder, of Plymouth, in experimenting with the new metal magnesium, has discovered some explosive compounds of tremendous power and striking peculiarities.

He ignited a small portion (about twenty grains) of one of these compounds during a lecture which he gave at the Plymouth Mechanics' Institute on the 5th inst., the instantaneous and dazzling effect of which upon the audience was like that of a flash of lightning, causing the room to appear for some seconds afterwards to be enveloped in darkness, though it was at the time brilliantly lighted with gas.

On causing two bars of magnesium to form the terminals of a powerful voltaic battery, which was prepared to exhibit the electric light, a most intense combustion ensued. One of the bars speedily became red-hot, entered into ebullition, and then burned spontaneously so furiously that it became necessary to plunge it into water to prevent its falling on the platform.

In this process portions of the burning metal detached themselves, and floated blazing on the surface of the water, decomposing it after the manner of potassium, and liberating hydrogen, which also burned.

The experiment had never been tried before, and the result possesses much scientific interest.

MYSTERIOUS CASE OF POISONING AT DAWLISH.

A recent number of the 'Western Times' informs us that the Dawlish people have lately been much excited by a rather remarkable case of suicide committed at the York Hotel. The main features of it, so far as popular interest is concerned, are as follows:—Late in the evening a middle-aged female, well dressed and of lady-like appearance, alighted at the station from one of the down trains, and proceeded to the above-mentioned hotel. Here she represented to the landlady that she had just arrived from America, and intended to stay at Dawlish a short time for the benefit of her health. She retired to rest, and on the following day was found dead in her bed, apparently having poisoned herself with "Battle's Vermin-Killer," packet labels of which were found by her bedside. It transpired, however, that the deceased was the wife of a stationer at Devonport; and on the inquest "several of the jury expressed surprise that the lady's husband had evinced so little concern in the disappearance of his wife from home. It appeared probable that he would have been still in ignorance as to what had become of her, had he not seen the report of the suicide in the newspapers." There was, for certain reasons, an adjournment of the inquest. It was finally agreed, however, that it was an instance of suicide from the effects of arsenic; that the deceased was subject to alternations of great excitement and depression of spirits; and that her husband had shown her great kindness and forbearance. We have been interested in this case, on account of certain physiological and forensic circumstances connected with it,—a trustworthy account of which we have received from a correspondent, and with the main points of which we shall now make our readers acquainted. The lady who committed suicide had several parcels of "rat poison" in her reticule or about the room, some of which had been opened, others kept as in reserve. Two papers of "Simpson's Vermin-Killer" had, it would seem, been disposed of, and one parcel of "Battle's" had apparently been used. Some blue stains were found in the mouth and at the angles of the jaw, the pocket-handkerchief being also stained in like manner. The rigidity and contortions of the dead body led Dr. Baker, of Dawlish (who was called in to see the deceased when she had been dead two or three hours), to infer that strychnia had been the cause of death. He sent the viscera to Dr. Herapath, of Bristol, who, from analysis, proved that arsenic was present in abundance in the gastric mucus and in the coats of the stomach, but that strychnia was not in either of these materials. Dr. Herapath found, likewise, traces of arsenic in the liver. What is the explanation of this discrepancy of analysis and condition of the body and mode of death? As Dr. Herapath observes, if strychnia were taken, it never got into the stomach at all! It is probable, however, as this gentleman explains it, that the first two packets did not kill her as quickly as she intended, and she then took the third packet, but that the contents never went further than the mouth. Some portion was ejected in consequence of the bitter taste, and to get rid of what remained of the latter an almond had been taken. Enough, however, of the powder (starch, Prussian blue, and strychnia, similar to what was employed in the Vyse case) remained behind to kill by absorption through the mucous membrane of the tongue, etc. The coroner, at the adjourned inquest, declined Dr. Herapath's evidence, as he had not given any order for a chemical analysis, and now objected to the county being put to the expense. "He said there was no doubt the case was one of suicide, therefore an analysis was unnecessary. The magistrates were very particular, and would not allow the expenses. Dr. Baker said the coroner had left the case with him. A country practitioner was not supposed to make an analysis, and he (Dr. Baker) was not prepared to state the cause of death unless the evidence of Dr. Herapath was taken. Dr. Herapath said that the law was at fault, as a medical gentleman was allowed only two guineas for making a *post-mortem* examination, and no man of education could be expected to do it for that sum. The coroner replied that he could not and would not let medical gentlemen act as Dr. Baker had done without the coroner's instructions." Dr. Herapath then made a voluntary statement, foregoing the usual fee. "He stated that death had been caused by arsenic, a quantity of which, found in the stomach, he then produced. The jury heartily thanked him for his kindness, and returned a verdict in accordance with his testimony, and that the deed was done during temporary insanity." It would be well if coroners and juries would remember that scientific men cannot live upon *thanks*, however hearty, any more than can the ordinary run of mortals.

The following letter on the above case has been received from Dr. Herapath:—

Sir,—I have only just succeeded in obtaining samples of Simpson's rat-poison from Messrs. Balkwell and Son, of Plymouth, who appear to be the only agents for the article in the West of England, as I have failed in getting it in most of the chief towns, even Exeter and Bristol, most of the druggists of whom I have inquired informing me that it is very seldom found in the trade. I have also analysed it, and find that the packets contain a very varied, irregular quantity of material, from $7\frac{1}{2}$ to $13\frac{1}{2}$ grains; four packets, containing $41\frac{1}{2}$ grains, giving an average of a little more than 10 grains for each powder, if all equally mixed and properly weighed and divided. The mixture consists of arsenious acid, potato-starch, coloured by smaltz, and flavoured or scented with some essential oil, probably oil of rhodium. I found 10 grains to contain 4 grains of arsenious acid. It is, therefore, certain that Mrs. Williams had arsenious acid in her possession, and that she must have taken from 6 to 8 grains, as two empty packets were found by the police in her bedroom. This is a quantity sufficient to kill, but requiring more time probably than she liked,—thus accounting for the opening of the third packet.

I greatly regret that there was no opportunity given me of examining the saliva for strychnia, as that would have determined the question whether that poison had also been taken into the mouth. Mrs. Williams had been buried in the interval of the adjournment of the inquest, and I never saw the handkerchief.

It is probable, therefore, that Mrs. Williams purchased all these rat and vermin poisons at Plymouth, on her way up to Dawlish from Devonport; and the tracing of the arsenic into her own possession is satisfactory to all parties, as the matter is now fully explained, and all other theories must for ever be set at rest.

I am, Sir, yours most obediently,

W. Bird Herapath.

MISCELLANEA.

Deaths by Poison.—Dr. Lankester, in his report, observes that the methods of self-destruction employed in the last two years have differed very considerably. Thus, in the year 1862-63, there were nineteen cases of poisoning, while in 1863-64 there were but nine. There was but one instance of poisoning by opium in the latter year, against four in the previous year, and two cases of poisoning by oxalic acid in the second year against five in the first year. The only poison employed in the second year, which was not used in the first, is corrosive sublimate; while strychnine, sulphuric acid, prussic acid, and potash, which were answerable for six deaths in the first year, do not appear in the list of the second.

Poisoning by the Endermic use of Atropine.—The following case is related by Dr. H. Ploss, of Leipsic:—A man, aged 33, who had an affection of the larynx, which was supposed to be a case of simple laryngitis by the physician who had been consulted, and a blister was ordered to be applied round the neck, to be dressed on the following day with an ointment composed of 15 parts of sulphate of atropine to 700 parts of lard. Some minutes after the application of the ointment, the patient suddenly sprang from his seat, in a state of indescribable anguish; he ran about the room, crying out that he was suffocated, that everything appeared black before his eyes, and that he felt as if he were being strangled. He violently tore off the dressing; and threw himself on his couch, his eyes fixed and his face fiery red. Dysphagia and dyspnœa increased more and more; convulsions of the limbs set in, resembling those of chorea; the breathing became very frequent; the pulse rose to 140 or 150; the patient could not utter a word. An attempt was made to bleed him; but this could not be done on account of the constant convulsive movements. It was equally impossible to introduce anything by the mouth or by the rectum. The breathing soon became interrupted, the pulse thready, and the patient died, scarcely two hours after the application of the ointment.—*Zeitschr. für Med. Chir. und Geburtsch.* and *Brit. Med. Journ.*

Poisoning from Drinking Hamburg Spirits.—An inquest was held by Mr. Payne, deputy-coroner, relative to the death of John West, one of three men who were poisoned by drinking Hamburg, or, as it is familiarly called, "amber spirits," at Fenning's Wharf. The evidence showed that the deceased had been employed on No. 14 floor of the warehouse at London Bridge, when he was sent to another floor, where he was told by a man that he could "get a drop." He and two others drank from a cask of Hamburg spirits, and they were all dreadfully injured. The deceased was found dead in No. 13 floor soon afterwards. William Ramton, the delivery foreman, said that it was the regular custom of the workmen to drink from the spirit casks whenever they had a chance. Mr. A. Artler, Custom-House gauger, stated that the spirit of which the men partook was 66·8 degrees above proof, and was in fact liquid fire. Mr. Lacey, surgeon, who was called to the deceased, said he died from collapse after poisoning by the spirit, which acted as an acrid poison on the coats of the stomach. The spirit contained so little water that it shrivelled up any surface containing water. The jury returned a verdict of death by poisoning from drinking spirits.

Robbery of Indigo.—At the Thames Police Court, Alfred Turnbull, Edward Gooding, Peter Connor, and Samuel Arnett, a chemist, were brought up on remand, charged, the first three with stealing three chests of indigo, valued at £180, from the London Docks, and the other with feloniously receiving the property, he well knowing it to be stolen.

On Friday, the 1st of the present month, 13 chests of indigo were delivered from the ship Wallasey, in the London Docks, and deposited in a warehouse. Four days afterwards three chests were missing. The Thames police were employed to detect the thieves and trace the property,—a duty which has been successfully performed. A greengrocer and coaldealer named William Woolridge, who was allowed to give evidence for the Crown, said that at half-past 12 o'clock in the afternoon of the 5th of the present month Turnbull called upon him and asked for the loan of six coal-sacks. He complied with his request, and Turnbull took away six sacks. On the following day Turnbull again called upon him, and he accompanied him in a cart to the waterside at Cubitt Town, Poplar, where he backed down to a barge. Six sacks, containing something bulky, were brought out of a barge by Turnbull, Gooding, and Connor, and put into the cart, which was driven to Rosemary Lane. He met the three prisoners again near Arnett's shop, and they assisted him in unloading the cart and taking the six sacks into Arnett's shop. Arnett was there to receive them. Woolridge identified the sacks, which were black when he lent them to Turnbull.

Mr. Joseph Crawley, indigo dealer, No. 91, Great Tower Street, said that Arnett called upon him with a sample of indigo, which he said represented 90 lb., and asked 4*s.* per lb. for it. He told Arnett it was not worth half the money. Arnett then asked him to advance some money upon the indigo, and he advanced him £3 upon it by a cheque produced by Mr. Evans. Next day he received 95 lb. of indigo from the prisoner, and advanced him £5 more by another cheque.

Mr. Partridge said a clear *primâ facie* case was made out, and committed the prisoners for trial at the next Middlesex Sessions. He refused to take bail for Arnett, or to allow Woolridge any certificate for his expenses for attendance.

Alleged Poisoning by Opium.—A woman, named Bibby, has been convicted of the manslaughter of her child at the Manchester Assizes, and sentenced to fifteen months' imprisonment. The dead body of the child was found secreted in a corded box at the Euston Station. It was supposed that the child's death was caused by an overdose of laudanum, carelessly administered by the prisoner, who was in the habit of giving it six, eight, or ten drops at a time, under the name of "quietness." The post-mortem examination showed congestion of the lungs, and fluid blood in the right cavities of the heart. No opium was discovered in the stomach.

Alleged Death from Drinking Paraffin Oil.—An inquest has been held at Castleford on the body of a glass-founder, named George Leach, who is supposed to have been poisoned by imbibing paraffin oil. Leach was found stretched on the ground, stiff and livid, and died in about twenty hours after he was found, without ever having given any tokens of sensibility. The testimony of Mr. Kemp, who had made a post-mortem examination of the body, showed that it was completely imbued with a substance smelling strongly of paraffin; but neither he nor Mr. Fairley, analytical chemist, were aware that paraffin or any similar substance had ever caused death. He had tried four ounces of paraffin, in two doses, upon a dog, and found after sixteen hours that the animal was little the worse for what it had taken, and seemed likely to recover. The jury were unable to arrive at any definite conclusion, and returned an open verdict.

Poisoning by Essence of Almonds.—An inquest has been held at Bexley, Kent, on the body of a boy named Clements, thirteen years of age. Deceased had been a page in a gentleman's family, and while some pomade was being prepared with essence of almonds in the kitchen of his master's house he tasted the liquid, and in a few hours afterwards suddenly became ill, then insensible, and died in a short time. A fellow-servant, who had also tasted the liquid, was with difficulty saved from a similar fate.—The jury returned a verdict of "Accidental death," with a suggestion that it would be conducive to the public safety if such articles were labelled "Poison." This addition to the verdict was caused by the remark of one of the jurors, who said he had been told that it was not customary to label *Essence of Almonds* "Poison," but this, it appears, referred to that only which had been deprived of prussic acid.

BRITISH PHARMACEUTICAL CONFERENCE.

The annual meeting of the members of the British Pharmaceutical Conference will be held at Birmingham, in September this year, at the time of the visit of the British Association to that town. Of the subjects suggested for investigation the following have been accepted, either by the gentlemen who proposed them or by other members, and a paper on each question will be read at the meeting:—

1. Extract of *Fucus vesiculosus* is occasionally prescribed for use in medicine. When made by the action of proof-spirit, a green product is obtained; when by water, a red extract results. What is the most eligible form in which to exhibit any medicinal principles that may be present in the plant? Accepted by J. Whitfield.

2. Valerianate of Zinc. Describe an easy method of determining the purity of this salt as found in commerce. Accepted by F. Sutton.

3. Valerianate of Iron. What is the best process for the preparation of this salt? What are its characters, and how may its purity be most readily ascertained? Accepted by F. Sutton.

9. Ergot. What is its active principle, and what the best preparation for its administration? Accepted by R. V. Tuson.

10. On some of the rarer essential oils. By C. Umney.

28. Euphorbine. Professor Tuson will add to some experiments he has already made on this substance, and report the result to the Conference.

33. Pereirine. Dr. C. A. Martius will communicate a paper on this body.

36. Some of the pill-masses of the Pharmacopœia are of inconvenient consistence, or acquire that condition by keeping; can this be obviated? Accepted by E. Wood.

43. On microscopic analysis applied to pharmacy. Continued by H. Deane and H. B. Brady.

44. Distilled waters. Should these be prepared from the raw material, or from the essential oil? Can any be advantageously prepared without distillation? What are the

advantages and disadvantages of the addition of spirit to and of the retention of excess of oil in contact with them? Accepted by J. C. Pooley.

45. To what does Senna owe its active properties, and what is the best solvent of the same? Is the Syrup of Senna P. B. a satisfactory preparation? What is the comparative medicinal value of senna leaflets and senna-pods? Accepted by J. A. Knights.

47. What is the quantity of Tannin in English Galls (*Cynips quercus-petioli*) at different stages of their growth? Can they at any period be employed economically as a substitute for the Nutgalls of commerce? Accepted by W. Judd.

101. Further researches on Hyoscyamine. Accepted by W. A. Tilden.

102. On the effects of soil and cultivation on the development of the active principles of plants. Accepted by T. T. P. B. Warren.

103. On the electrical resistances of the fixed and volatile oils. Accepted by T. T. P. B. Warren.

105. Emulsions. What are the best methods of forming emulsions from fixed and volatile oils, balsams, spermaceti, camphor, myrrh, ammoniac, guaiacum, etc.? Experimental investigation and compilation of existing knowledge of this subject is undertaken by Mr. Proctor, who will be glad to receive communications pointing out cases of difficulty or offering suggestions.

106. Aconite. Does aconite owe any of its activity to the volatile acrid body said to exist in it? Give a process for the preparation of Aconitine. Accepted by T. B. Groves.

107. Nitrite of Soda. By what modification of the process given in the British Pharmacopœia, or by what other process can this salt be successfully and economically prepared? Accepted by W. D. Howard.

109. Ammonia. What are the source, annual yield, and characteristics of the so-called Volcanic Ammonia? Accepted by W. D. Howard.

112. What is the nature of the precipitate formed in Ipecacuanha Wine; how is it affected by the nature of the wine used? Accepted by G. Johnson.

113. Researches on Calabar Bean. Continued by J. B. Edwards.

114. The Iodo-hydrargyride of Potassium is a test for Methylic Alcohol in presence of Ethylic Alcohol. Is its action in any way interfered with by the presence of organic bodies usually existing in the tinctures of the Pharmacopœia? If so, under what circumstances and precautions can it be applied? Accepted by J. Tuck.

116. Phosphoric Acid. Required,—a correct table of the strength of solutions of phosphoric acid of various densities. Accepted by J. Watts.

117. Liquor Ferri Perchloridi. A critical examination of the method of preparation adopted in the British Pharmacopœia, including suggestions for obtaining it, and the tincture, of definite composition. Accepted by J. Attfield.

118. Chemical research on the Podophyllin of the British Pharmacopœia. Accepted by J. B. Barnes.

119. Report on the processes for the preparation of Glacial Acetic Acid, with suggestions. (See Pharm. Journ. 2nd ser. vol. v. p. 561.) Accepted by W. E. Heathfield.

120. Report on the advantages or disadvantages of the employment, in pharmacy, of Nitric Acid of sp. gr. 1·5. Accepted by J. Spearing.

123. Report on the strength of Emplastrum Cantharidis, P. B., with suggestions. (See Pharm. Journ. 2nd ser. vol. v. p. 567.) Accepted by A. Allchin.

124. Resins of Jalap and Scammony. What are the best excipients to use in forming these resins into pills. (See Pharm. Journ. 2nd ser. vol. v. p. 569.) Accepted by T. J. Hasselby.

126. Cinchona. Can a process for Extractum Cinchonæ Flavæ Liquidum be devised which shall effect the entire exhaustion of the bark of its alkaloids? (See Pharm. Journ. 2nd ser. vol. v. p. 569.) Accepted by C. Umney.

127. Mistura Creasoti. Report on the formula given in the British Pharmacopœia, with suggestions. (See Pharm. Journ. 2nd ser. vol. v. p. 629.) Accepted by J. Tuck.

128. On some of the Tinctures of the British Pharmacopœia. By J. Adams.

129. Report on the medicinal use of Artificial Organic Acids and Bases. Accepted y C. W. Quin.

130. Report on the use of butter of *Theobroma Cacao* in Pharmacy. Accepted by . A. Peele and J. Spearing.

131. On the flavour of Castor Oil. Why is Italian castor-oil less unpalatable than other commercial varieties? Accepted by H. GROVES.

132. On the processes for estimating Nitrite of Soda. By C. R. C. TICHBORNE.

Subjects relating to Adulterations, Impurities, and Faults of Manufacture.

A Committee of five gentlemen—Dr. Attfield, of London; Mr. T. B. Groves, of Weymouth; Mr. B. S. Proctor, of Grey Street, Newcastle; Mr. F. M. Rimmington, of Bradford; and Mr. F. Sutton, of Bank Plain, Norwich—has the general charge of these subjects relating to the purity of medicines. Either member of the Committee will be glad to receive directly, or through the General Secretaries, authentic specimens of substances whose examination would tend to throw light on the questions. The analysis of such specimens will be free of cost.

54. Large quantities of cotton-seed oil are expressed in this country, and used for admixture with other oils. What are the properties of cotton-seed oil, and can it be used in pharmacy? Accepted by R. REYNOLDS.

55. Essential oils, their adulterations by turpentine, and tests of purity. Accepted by H. S. EVANS.

58. Report on the strength and purity of diluted and undiluted officinal acids. Accepted by D. H. JAY.

59. Report on the strength and purity of the alkaline solutions (Potash, Ammonia, etc.), met with in pharmacy. Accepted by D. H. JAY.

60. Report on the various James's Powders. Accepted by W. T. FEWTRELL.

61. The composition of the bottled Mineral Waters of Commerce. Accepted by H. MATTHEWS.

62. On the Calamine and Oxide of Zinc of Pharmacy. Accepted by R. H. DAVIS.

63. Report on the purity of commercial Iodides and Bromides, other than the Iodide of Potassium. Accepted by H. MATTHEWS.

67. Report on the strength and condition of commercial specimens of such mercurial preparations as Mercury with Chalk, Mercurial Ointment, etc. Accepted by J. COUPLAND.

70. On commercial Pepsine. Accepted by J. C. BROUGH and J. C. BRAITHWAITE.

75. Examination of various specimens of Citrate of Iron and Quinine. Continued by J. C. BRAITHWAITE.

76. Chloroform, Ether, Sweet Spirits of Nitre, and Sal Volatile are often prepared from Methylated Spirit. Required, tests or reliable methods whereby they may be proved to have been so prepared. Accepted by J. TUCK.

77. Report on the purity of commercial Tartar Emetic. Accepted by J. C. BROUGH.

81. Report on the purity of commercial powders of ginger and cinchona. By F. M. RIMMINGTON.

Several other papers are promised.

It is hoped that each member of the British Pharmaceutical Conference will suggest subjects for investigation, work upon subjects suggested by himself or by others, contribute information tending to throw light on questions relating to adulterations and impurities, collect and forward specimens whose examination would afford similar information, *or in some other way to aid in the advancement of pharmacy.* Any new facts that are discovered during an investigation may be at once published by an author at any meeting of a scientific society, in any scientific journal, or in any other way he may desire; in that case he is expected to send a short report on the subject to the annual meeting.

The current list of subjects requiring investigation is sent to members immediately after their election, and a new list immediately after every annual meeting. The list for 1864–1865, containing several questions at present unaccepted, can be obtained of either of the Honorary General Secretaries—Dr. Attfield, 17, Bloomsbury Square, London, W.C., and Mr. R. Reynolds, F.C.S., 13, Briggate, Leeds; or of the Local Secretary, Mr. W. Southall, jun., 17, Bull Street, Birmingham.

The future annual meetings will probably be held at the time and place of the visit of the British Association.

Gentlemen desiring to join the Conference must be nominated by two Members. The yearly subscription is five shillings, due in advance, on the 1st of July.

BOOKS RECEIVED.

THE DISPENSATORY OF THE UNITED STATES OF AMERICA. By GEORGE B. WOOD, M.D., etc., and FRANKLIN BACHE, M.D., etc. Twelfth Edition, carefully revised. Philadelphia: J. B. Lippincott and Co. 1865. pp. 1704. (Presented by Dr. G. B. Wood.)

NOTES FOR STUDENTS IN CHEMISTRY, being a Syllabus of Chemistry and Practical Chemistry. By ALBERT J. BERNAYS. Fourth Edition, revised and corrected. London: John Churchill and Sons, New Burlington Street. 1865.

TO CORRESPONDENTS.

An Apprentice.—You will be expected to be acquainted with all articles of the Materia Medica in common use, and with the preparations in like manner.

Tyro (Brixton).—Professor Bentley commenced his course of lectures at the Gardens on Friday, the 19th of May.

Assistant (Bristol).—Bentley's 'Manual of Botany,' price 12*s.* 6*d.* It is published by Churchill and Sons.

Waiting (Staplehurst), and *Apprentice* (Retford).—On the 1st of October. The work has been delayed in consequence of the illness of the Editor.

Retort.—(1) "Frangipanne Bouquet." ℞ Ess. Vitivert ℥iij; Ol. Neroli ♏ xv; Ol. Santal. ʒss; Otto de Rose ♏ xl; Ess. Moschi ʒiij; Esprit de Violette ℥ij; Ess. Ambregris ʒvj; Sp. Vini Rect. ad ℥xx. M. (2) We believe the so-called "Fly Papers" are prepared with a solution of strychnia. (3) Piesse's 'Art of Perfumery' would probably afford the best information on the subject. (4) No: apply by letter to the Secretary, 17, Bloomsbury Square.

Johannes.—Obtain Fownes's 'Chemistry' and Bentley's 'Manual of Botany.'

C. B. H. (Guildford).—By "Digredium" we presume *Diacrydium* is intended. This is a term applied to Scammony, prepared with either decoction of Liquorice or decoction of Quince, in the proportion of one part of Scammony to two parts of the decoction, and the mixture evaporated to dryness.

A Student (Paisley) should consult a medical man.

J. S. (Manchester).—The article sold as "Liebig's Food for Infants" consists, we believe, of malt flour, with the addition of a small quantity of alkali, either bicarbonate of potash or bicarbonate of soda. A "New Soup for Children," recommended by Liebig, is made as follows:—"Half an ounce of wheaten meal, half an ounce of malt flour, and 7½ grains of bicarbonate of potash, are weighed, mixed first with one another, and afterwards with an ounce of water, and lastly with five ounces of milk; the mixture is then heated, with constant stirring, over a very gentle fire, until it begins to thicken; the vessel is now removed from the fire, and its contents are stirred for five minutes, these are then heated once more and again removed, when a new thickening occurs; lastly, the whole is made to boil. After the separation of the bran from the milk, through a fine sieve, the soup is ready for use."

An Apprentice (Sittingbourne).—(1) Lime-juice and glycerine is sometimes used in the proportion of three parts of the former to one part of the latter. (2) See answer to *J. S.* (Manchester).

H. T. (Bishop Auckland).—(1.) The specimen sent for examination is Sulphate of Magnesia. (2.) Babington's 'Manual of Botany.'

Epsilon (Bristol).—Apply by letter to the Secretary, 17, Bloomsbury Square.

J. B. (Leeds).—The cost is only a few shillings. Apply at Stationers' Hall.

ERRATUM.—Cochineal Colouring, page 615, *for* "wine quart" *read* "Winchester quart."

Instructions from Members and Associates respecting the transmission of the Journal before the 25th of the month, to ELIAS BREMRIDGE, Secretary, 17, Bloomsbury Square, W.C.

Advertisements (not later than the 23rd) to Messrs. CHURCHILL, New Burlington Street. Other communications to the Editors, 17, Bloomsbury Square.

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LIST

OF THE

MEMBERS, ASSOCIATES, AND APPRENTICES

OF

The Pharmaceutical Society of Great Britain,

INCLUDING THE NAMES OF THE LOCAL SECRETARIES.

1865.

MEMBERS OF THE COUNCIL.

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Waugh, George ....177, Regent Street.

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HONORARY MEMBERS.

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Fäyk Pasha (Francis Della Sudda), Constantinople.
Fehling, Hermann von, Professor of Chemistry, Stuttgard.
Frankland, Edward, Ph.D., F.R.S., Royal Institution, London.
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Thwaites, G. H. K., F.R.S., F.L.S., Royal Botanic Gardens, Peradenia, Ceylon.
Ure, Alexander, A.M., F.R.C.S., 18, Upper Seymour Street, Portman Square.

Victoria, the President of the Pharmaceutical Society.
Warington, Robert, F.C.S., Apothecaries' Hall, London.
Weddell, H. A., M.D., F.L.S., Poitiers, France.
Wood, George B., M.D., Philadelphia.
Würtz, Charles Adolphe, M.D., Ecole de Médecine, Paris.

FOREIGN AND COLONIAL LIFE MEMBERS.

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1851		Alexander, James Lyon	Sydney
1858	486	Avice, Charles Ernest	Mauritius
1848	34	Baeër, Gustave E.	Strasbourg
1855	401	Baissac, Pierre Joseph	Mauritius
1859		Baker, George S	Geneva
1852	167	Baschet, George Constant	Mauritius
1858	505	Baschet, Pierre Edmond	Mauritius
1849		Baylis, William	Launceston, Tasmania
1852		Bishop, William	Wellington, N. Zealand
1858	506	Boullé, Janvier Alfred	Mauritius
1862		Bowen, William	Melbourne
1852		Carpenter, Henry	Demerara
1854	347	Dru, Casimir Theodore A.	Mauritius
1864	726	Ferreira, Antonio Alves	Rio de Janeiro
1849	74	Fleurot, Emile	Mauritius
1855	389	Francis, Henry	Melbourne
1859	3	French, Joseph B.	Castlemaine, Australia
1863	701	Gras, Marcel Amédée	Mauritius
1864	438	Groves, Henry	Florence
1853		Guiot, Jean Félix E.	Mauritius
1863	702	Guiot, Louis Edouard	Mauritius
1861	418	Kemp, David Skinner	Bombay
1847		Lediard, Charles	St. Vincent
1847	28	Mailloux, Joseph	Mauritius
1859	558	Mathew, John Alfred	Cape Town
1858	508	Minet, Alphonse Edouard	Mauritius
1863	704	Merle, Etienne Nemours	Mauritius
1847	19	Nobrega, Gerardo José da	Madeira
1855	407	Noël, Ferdinand	Mauritius
1860	526	Parker, Charles	Melbourne
1859	549	Perrot, Pierre Bénoni	Mauritius
1852	118	Regnaud, Charles	Mauritius
1860	588	Renaud, Desiré Monchéry	Mauritius
1850		Roberts, Henry	Florence
1852		Roberts, Thomas H.	Gibraltar
1852	72	Sinimberghi, Nicholas	Rome
1858	467	Skinner, Henry	Kingston, Canada West
1857	468	De Valancé, Charles P.	Mauritius
1859		White, Robert	California

The figures in the second column correspond with the number of the Certificate of Examination.

LONDON MEMBERS.

Year of Membership.	No. of Certificate.	NAME.	ADDRESS.
1864	76	Alexander, William	91, Blackman Street, Borough
1850	70	Allchin, Alfred	Richmond Road, Barnsbury Park
1841		Allen, William	2, Morgan's Place, Islington
1864		Allen, Henry	20, Charterhouse Square
1842		Anderson, Charles	23, Lower Belgrave Street
1857	241	Andrews, Frederick	23, Leinster Terrace, Upper Hyde [Pk. Gardens
1862	661	*Applegate, Edwin	Upper Holloway
1842		Appleton, Thomas Cass	45, Curzon Street
1841		Ashton, William	154, Sloane Street
1853		Attwood, Alfred	61, Cannon Street
1841		Austin, Henry	161, Bermondsey Street
1853		Bailey, Delamore J.	30, Conduit Street
1864	767	Baily, John	Clapham Road
1841		Baiss, James	102, Leadenhall Street
1841		Baiss, William A.	102, Leadenhall Street
1859	556	*Baker, Alfred Philip	374, Old Kent Road
1865	815	Balch, Edwin	14, Claremont Place, North Brixton
1861	537	*Baldock, John Henry	14, Claremont Place, North Brixton
1845		Ball, Thomas M.	77, St. George's Road, Southwark
1841		Balmer, John	94, St. John Street Road
1842		Barber, Joseph	7, Orange Street, Red Lion Square
1841		Barber, Thomas A.	2, Scott's Place, Islington
1856	14	Barkley, William	3, Langham Place
1848		Barnard, John	31, Upper Gower Street
1853		Barnes, James B.	1, Trevor Terrace, Knightsbridge
1865	269	Barret, Edward Louis	22, Thrawl Street, Spitalfields
1853		Barron, Frederick	2, Bush Lane
1841		Bartlett, William	1, Brettin Terrace, Chelsea
1864	608	*Bass, James	81, Hatton Garden
1844		Bastick, William	2, Brook Street
1841		Bayley, Edmund	17, St. Mary's Terr., Walworth Rd.
1851		Beaton, John	Kilburn
1863		Beaton, William John	132, Edgware Road
1853		Becket, William E.	6, Giltspur Street
1853	17	*Bell, William Henderson	48, Albany Street, Regent's Park
1864	759	Berdoe, Edward	511, Hackney Road
1841		Bigg, Thomas	Great Dover Street
1842		Binge, Thomas	23, Stockbridge Terrace, Pimlico
1850	57	Bird, Augustus	22, High Street, Kensington
1841		Bird, William L.	42, Castle Street East
1865	745	Bird, Robert	Clapham
1859	322	Bishop, Alfred	Mile End New Town
1843		Blake, Charles T.	47, Piccadilly
1842		Bland, John	57, Penton Street, Pentonville
1841		Blandford, John F.	9, Bruton Street
1863	518	Bolton, Horatio Nelson	High Street, Stoke Newington
1853		Bolton, William	146, Holborn Bars
1842		Bond, Henry	11, Cross Street, Hoxton New Town
1865	840	Booth, Samuel	33, Cardington Street
1853		Boothby, Henry Neal	72, Crawford Street
1842		Boully, Peter	Queen's Road, Bayswater
1849		Bourdas, Isaiah	10, Pont Street, Belgrave Square

* Life Members.

Year of Membership.	No. of Certificate.	NAME.	ADDRESS.
1862	604	*Bourdas, Isaiah, jun.	21, Upper Eccleston-pl., Belgrave rd.
1842		Bowden, Edward	13, Charles Street, St. James's
1852		Bower, William	96, Tottenham Court Road
1842		Bradley, John	4, Grove Road, St. John's Wood.
1847		Brewer, Eli	43, Duke Street, Manchester Sq.
1853	190	Bromley, Richard Martin	Denmark Hill
1845		Brooks, Charles	Southville, Wandsworth Road
1842		Brown, James	27, Aldgate
1864	52	Brown, Robert Thomas	40, Essex Road
1842		Buck, Thomas	Kingsland Green
1842		Buckle, Christopher Fran.	77, Gray's Inn Road
1845		*Burden, Edward	38, Duke Street, Grosvenor Square
1846		Burden, Thomas	6, Store Street, Bedford Square
1853		Burgoyne, James	16, Coleman Street
1857	333	*Butt, Edward Northway	235, Oxford Street
1855		Carr, John	171, High Holborn
1853		Carrick, James	46, Churton Street, Belgrave Road
1853		Carteighe, John	172, New Bond Street
1864	708	Carteighe, Michael	172, New Bond Street
1853		*Chard, Frederick J.	13, Eccleston Street South
1847		Charsley, Nathaniel	4, Manor Rise, Brixton
1853		Chubb, James C.	59, St. John Street, Clerkenwell
1845		Clarke, Benjamin	Mare Street, Hackney
1853		*Cockrill, James	2, Wellington St., Waterloo Town
1849		Cocksedge, Henry B.	20, Bucklersbury
1852		Colchester, William M.	2, Crown Street, Hoxton
1854	191	Coles, Charles	1, King's College Road.
1842		Coles, John	New Road, Camberwell
1845		Collins, John R.	Haverstock Hill
1853		Collins, Robert N.	Oxford Court, Cannon Street
1841		Compton, Charles	14, Brewer Street, Golden Square
1848		Constance, Edward	37, Leadenhall Street
1841		Constance, William	5, Hanover Place, Regent's Park
1853		Cooke, John	171, Hoxton Old Town
1864	728	Cooper, Albert	10, Abingdon Terrace, Kensington
1853		Cooper, Robert H.	20, Royal Exchange
1848		Cooper, William T.	26, Oxford Street
1862		Cooper, William Henry	Andover Terrace, Hornsey Road
1864	466	*Cornelius, James	Camden Road
1853		Cornelius, Joseph	Clapham
1845		Cracknell, Charles	107, Edgware Road
1859		Crispe, James	4, Cheapside
1853		Cross, Henry	309, New North Road
1841		Croucher, John T.	223, High Street, Shadwell
1853		Croyden, Charles	37, Wigmore Street
1852		Curtis, Frederick	48, Baker Street
1853		*Darby, Stephen	140, Leadenhall Street
1842		Davenport, John T.	33, Great Russell St., Bloomsbury
1848		Davids, George Ware	South Hackney
1845		Davies, Henry E.	43, Wood Street, City
1865	769	Davies, William	292, Gray's Inn Road
1860	377	Davies, William G.	28, Sidney Place, Commercial Road
1841		*Davy, Charles	100, Upper Thames Street
1841		Deane, Henry	Clapham

Year of Membership.	No. of Certificate.	NAME.	ADDRESS.
1850		Dickinson, William	16, Cambridge St., Edgware Road.
1842		Doughty, Ed. Davidson	4, William Street, Knightsbridge
1852		Dowthwaite, William	55, Bishopsgate Street Without
1864	729	Dyer, Abraham J.	3, Acre Lane, Brixton
1859	352	Dyson, William B.	4, Gloucester Rd., South Kensington
1845		Eade, George	72, Goswell Road
1847		Eardley, John	14, Charles St., Westbourne Terrace
1853		Edwards, William S.	14, Eltham Place, Old Kent Road
1853		Elam, Benjamin	196, Oxford Street
1853		Elkington, Edward	56, Grange Road, Bermondsey
1849		Ellis, George H.	4, Pavement, Finsbury
1853		Elvey, Thomas	8, Halkin Street West
1841		Evans, John	60, Bartholomew Close
1851		Evans, John H.	60, Bartholomew Close
1841		Faulconer, Robert S.	Keen's Row, Walworth
1864	762	Faulkner, James	13, Queen's Terrace, St. John's Wd.
1853		Fells, John	Clapham
1853		Fenn, John T.	83, Regent Street, Westminster
1856	88	*Field, James John	5A, Holloway Place, Holloway
1841		Field, William	83, Brompton Road
1842		Fincham, Robert	57, Baker Street
1864		Foott, Richard Rogers	8, Lower Eaton Street
1857	160	Forrest, Richard	9, Celbridge Pl., Westbourne Park
1842		Foulger, Samuel	133, St. George's Street East
1841		Fowler, Richard	14, Brewer Street, Golden Square
1863	623	*Fowler, Stanley	36, Elgin Crescent, Notting Hill
1841		Fox, William	48, Church Street, Bethnal Green
1856		Francis, George B.	11, Old Fish Street, City
1853		Freeman, Richard	5. Clayton Place, Kennington Road
1843		*Freeman, Robert	38, High Street, Kensington
1853		Gadd, Charles	1, New Bridge Street, Vauxhall
1842		Gale, Henry	3, Millbrook Place, Camden Town
1854	78	Gale, Samuel	338, Oxford Street
1841		Garden, Alexander	372, Oxford Street
1843		Garden, Felix R.	372, Oxford Street
1858		Gedge, William Stedman	65, St. John Street
1850		*Gerard, Philip Augustus	390, Strand
1848		Gigner, John	King's Road, Chelsea
1843		Gill, George W.	15, Crown Place, Walworth
1842		Glover, George	19, Goodge Street
1841		*Gloyne, Charles Glynne	20, Victoria Road, Kensington
1853		Golding, William	172, Albany Street
1842		Goodbarne, Thomas	13, Charles Place, Charles Square
1842		Goodbarne, Thomas R.	13, Charles Place, Charles Square
1853		Goode, Thomas	47, Minories
1847		Goodger, David	31, Regent Street
1853		Goosey, William	6, Ocean Row, Stepney
1853		Gorton, John G.	144, High Street, Whitechapel
1854		*Gosden, Henry	140, Leadenhall Street
1856		Gould, John	Chicksand Street
1853		Gould, John Granger	198, Oxford Street
1847		Greenish, Thomas	20, New Street, Dorset Square
1853		Groves, Edward	4, Bernard St., Regent's Park Road
1842		Griffiths, John	Clerkenwell Green

Year of Membership.	No. of Certificate.	NAME.	ADDRESS.
1853		Grisdale, John M.	216, Tottenham Court Road
1853		Gristock, Thomas	42, South St., Manchester Square
1863	703	Grundy, Thomas	27, Chalk Farm Road
1851		Gulliver, William	33, Lower Belgrave Street
1857		Hall, Robert	48, Wigmore Street
1841		*Hanbury, Daniel Bell	Plough Court, Lombard Street
1857		*Hanbury, Daniel	Plough Court, Lombard Street
1863	38	Harrison, Robert Hooper	Pownall Road, Dalston
1852		Harvey, Edward	6, Giltspur Street
1855		Haselden, Adolphus F.	18, Conduit Street
1843		Hemingway, Alexander	20, Portman Street
1842		Henly, John C.	213, Upper Thames Street
1853		Henty, Henry M.	87, High Street, St. John's Wood
1841		Herring, Edward	40, Aldersgate Street
1843		Hewitt, John	1, Wellclose Street, Wellclose Sq.
1842		Hewlett, Charles J.	Cree Church Lane
1864	772	Hickey, Evan Lewis	199, King's Road, Chelsea
1852		Hickley, Thomas P.	15, St. Alban's Place, Edgware Road
1865	571	*Hickman, William	Archer Street, Notting Hill
1842		Hill, Arthur S.	11, Little Britain
1853		Hill, Arthur B.	11, Little Britain
1848		Hills, Thomas Hyde	338, Oxford Street
1864	561	*Hinton, Henry A.	35, Bedford Street, Covent Garden
1852		Hockin, John B.	38, Duke Street, Manchester Square
1848		Hodgkinson, Henry	3, Newland Terrace, Kensington
1852		Hogg, Robert	9, Albion Place, Hyde Park Square
1841		Hooper, Bartlett	43, King William Street, City
1841		Hooper, William	24, Gt. Russell St., Covent Garden
1842		Hooper, William	7, Pall Mall East
1853		Hopkin, William K.	5, New Cavendish Street
1849		Hopkins, Thomas	34, Montague Square
1851		Hopkins, Thomas B.	Tulse Hill, Brixton
1853		Hora, Henry W.	58, Minories
1853	175	Horncastle, John	12, Stanhope Terrace
1841		Horner, Edward	20, Bucklersbury
1841		Horner, James T.	20, Bucklersbury
1859		Howden, Robert	78, Gracechurch Street
1856	412	Howell, Maurice	Peckham
1856	435	*Howell. Thomas	168, High Street, Camden Town
1842		Hucklebridge, James M.	103, Upper Ebury Street
1841		Hudson, William B.	27, Haymarket
1843		Hughes, William P.	171, Hoxton Old Town
1853		Hugill, John	61, Cannon Street
1842		Humpage, Benjamin	51, Judd Street
1862	494	Humphreys, Richard	9, Upper Belsize Ter., Belsize Park
1853	198	*Hunt, William	Camberwell Green
1853		Huskisson, Henry O.	12, Constitution Row, Gray's Inn Rd.
1842		Huskisson, John	12, Swinton Street
1841		*Huskisson, William	12, Swinton Street
1848		Huxtable, John	104, St. John's Street Road
1865	803	Hyslop, John Cahill	54, New Church St., Lisson Grove
1860	497	*Icke, Henry Scott	11, Old Fish Street
1863	685	Ince, Joseph	26, St. George's Pl., Knightsbridge
1841		Jackson, John	47, Southampton Row

Year of Membership.	No. of Certificate.	NAME.	ADDRESS.
1845		Jeynes, George W.	42, Princess Street, Edgware Road
1853	592	Jobson, Thomas C. W.	87, Lever Street, Goswell Street
1861		Johnson, Benjamin M.	70, Tottenham Court Road
1853		Jolley, George	13, Curzon Street, Mayfair
1849		Jones, Henry S.	139, Fulham Road
1842		Jones, Peter	11, Norton Folgate
1864	774	Jones, William	Allason Terrace, Kensington
1845		Jones, William John	3, Newland Terrace, Kensington
1841		Keating, Thomas	79, St. Paul's Churchyard
1842		Kemp, Richard	208, Upper Street, Islington
1842		Kemp, Robert	205, Holloway Road
1859	325	Kendall, Charles Fisher	14, Old Dorset Place, Clapham Road
1841		Kent, Thomas	226, Blackfriars Road
1848		*Kernot, George	3, Chrisp Street, Poplar
1852	81	Kershaw, George	113, Park Street, Camden Town
1853		Kettle, Joseph	42, Castle Street East
1862	307	Kiddle, William Lambert	34, Tavistock Place
1853		King, Charles T.	86, Snow Hill
1853		King, Robert	7, Cranbourne Street
1855	309	Kingdon, William Y.	6, Devonshire Terrace, Notting Hill
1853		Lacy, Benjamin W.	13, Westbourne Grove
1842		*Langton, Frederick C. R.	226, Upper Thames Street
1850		Large, John H.	65, New North Road
1853		Lavers, Henry Richard	28, Old Street Road
1857	429	Lawrence, Henry	49, High Street, Kensington
1855		Lawrence, Frederick	383, Kentish Town Road
1841		Lescher, Joseph S.	60, Bartholomew Close
1842		Lessey, John	97, High Street, Marylebone
1853		Lidwell, Joshua E.	130, High Street, Notting Hill
1861	388	*Lomas, Joseph W.	5, Henry's Place, Old Kent Road
1853	260	Long, George	42, St. George's Road, Battersea
1860	586	Long, Henry	48, High Street, Notting Hill
1853		Lowe, William E.	8, Stafford Street, Bond Street
1841		*Luckombe, Charles	86, Snow Hill
1863		Mackey, John Brunt	15, Bouverie Street
1841		*Mackmurdo, Edward	100, Upper Thames Street
1849		McCulloch, Charles	Covent Garden
1842		McCulloch, William	5, Coleman Street
1853		McDougall, William	8, Union Terrace, Notting Hill
1849		Maitland, Alexander	8, Torrington Place, Torrington Sq
1841		Maitland, John	10, Chester Place, Hyde Park
1853		Mansell, William	Plough Court, Lombard Street
1853		Marris, Joseph	37, Berners Street
1853		Marshall, Thomas	2, Claylands Place, Clapham Road
1853		Matland, George	10, Nassau Place, Commercial Road
1842		May, John	Battersea
1857		*Medlock, Henry	20, Great Marlborough Street
1842		Meggeson, George	Wandsworth
1853		Merrell, James	1, Queen's Terrace, Camden Villas
1857	485	*Michell, Frederic	3, Rye Lane, Peckham
1863		Middleton, Francis	338, Oxford Street
1855		Mitchell, John	254, Upper Street, Islington
1842		Moody, James	24, Church Street, Camberwell
1846		Moore, James L.	1, Craven Place, Westbourne Ter.

Year of Membership.	No. of Certificate.	NAME.	ADDRESS.
1841		*Mordaunt, John	
1864	654	*Morgan, David..............	Camden Town
1864	636	*Morris, Henry	2, Queen's Terr., St. John's Wood
1853		Morson, Thomas	19, Southampton Row
1841		*Morson, Thomas N. R. ...	38, Queen Square, Bloomsbury
1841		*Moscrop, Edward H.	140, Strand
1855		Mould, Samuel...............	21, Moorgate Street
1855	218	Mumford, George	5, Bathurst Street, Hyde Park
1860	519	Nicholson, Frederick	216, St. Paul's Road, Highbury
1853		Northway, John	27, Great Tower Street
1865	788	Nosworthy, Robert.........	207, Holloway Road
1855		Oldfield, Henry	88, Leadenhall Street
1864	775	Orpe, Thomas N.............	329, Old Kent Road
1841		Orridge, Benjamin B.	30, Bucklersbury
1841		*Orridge, William	22, Ludgate Hill
1853		Palmer, Robert..............	35, Ovington Square
1853		*Parnell, George William...	11, Victoria Road, Pimlico
1842		Pasmore, James	5, Colville Terrace, Chelsea
1853		Pattison, George	126, St. John Street Road
1841		Pedler, George S.............	199, Fleet Street
1842		*Penrose, Arthur Wellesley	7, Amwell Street, Clerkenwell
1853		Pepper, John	1, Bedford Street, Bedford Square
1843		Peppin, Sydenham H.......	25, Princes Street, Leicester Sq.
1854		Phillips, John	106, King's Cross Road
1842		Philpot, Henry...............	32, Praed Street, Paddington
1858	341	*Pidduck, John	Harrow Road
1843		Plummer, George............	High Street, Peckham
1841		Pollock, Thomas	129, Fenchurch Street
1854	15	Porter, William Henry ...	Loughborough Road, Brixton
1842		Potts, Robert U.	26, South Audley Street
1846		Pratt, Edmund...............	27, Bishopsgate Within
1842		Preston, Joseph T.	88, Leadenhall Street
1865	422	Preston, Richard	Fulham Road
1855	68	Quiller, Charles R.	15, Sloane Square
1859	397	Radermacher, Charles J....	173, Sloane Street
1853		Readman, Henry	18, Mortimer Street, Cavendish Sq.
1841		Redwood, Theophilus	19, Montague Street, Russell Sq.
1861	108	*Reeve, Edward J.............	Kilburn
1856		Reynolds, James John......	3, Hanover Street
1865	789	Rhind, William W.	Gloucester Road, Regent's Park
1854		Richards, James	40, New Bridge Street, Blackfriars
1845		Richardson, George.........	12, Norland Place, Notting Hill
1848		Ridsdale, James	344, Caledonian Road
1843		Roach, Pope	8, St. James's Street
1860	393	*Robbins, John	372, Oxford Street
1863		Roberts, Hen. Constable..	254, High Street, Southwark.
1841		Rouse, Benjamin R. C.......	9, Wellington Street, Southwark
1842		Rouse, Frederick J..........	Clapham
1857	328	Rowntree, Thomas	1, Arundel Place, Islington
1859	415	Rowson, Henry...............	18, Chichester Street
1848		Sadler, William C.	13, Norton Folgate
1841		Sainsbury, Samuel	177, Strand
1865	804	Salman, Thomas	Cornwall Road, Westbourne Park
1843		Sandford, George W.	47, Piccadilly

Year of Membership.	No. of Certificate.	NAME.	ADDRESS.
1863	610	*Sanger, William Albert ...	150, Oxford Street
1853		Schacht, William............	6, Finsbury Place South.
1843		*Sharpe, George Young ...	34, High Street, Notting Hill
1841		*Shirley, John George	1, Westbourne Grove, Bayswater
1852		Simmons, Joseph	38, Lambeth Walk
1851	89	Sims, John F.	8, Hemingford Place, Barnsbury
1854		Skidmore, John..............	3, Charles St. West, Westbourne Ter.
1842		Slipper, James	86, Leather Lane
1847		Smith, William F.	12, Keen's Row, Walworth
1854		Snell, Glanville A............	3, Hampton Ter., Hampstead Rd.
1842		Snelling, Francis	23, Farringdon Street
1843		Solly, Stephen F.............	3, St. George's Circus, Southwark
1844	1	*Sparks, John	147, Offord Road, Barnsbury
1841		*Squire, Peter..................	277, Oxford Street
1841		Squire, William	5, Coleman Street
1863	46	Starkie, Richard Stringer .	4, Strand
1858	147	Stathers, John	43, Norland Road, Notting Hill
1849		Stead, John M................	213, Upper Thames Street
1842		Steer, Philip R...............	Church Street, Hackney
1854	97	Stocken, James...............	13, Euston Square
1850		Stuart, John E...............	172, New Bond Street
1853		Summers, James R..........	43, Curtain Road
1854		Swire, George	Brixton Hill
1841		Swire, Roger..................	14, Edgware Road
1853		Symons, William	17, St. Mark's Cres., Regent's Pk.
1854		Taylor, John	77, Hackney Road
1864	777	Taylor, Thomas	Peckham
1853		Thomas, Henry...............	7, Upper St. Martin's Lane
1851		Thomas, Richard W.	10, Pall Mall
1845		Thompson, Henry A.	86, Chiswell Street
1857	372	Tibbs, Frederick	47, Blackfriars Road
1860		Tilburn, Robert James ...	223, Gray's Inn Road
1841		Tippett, Benjamin M.	3, Sloane Street
1841		Tonge, George	213, Upper Thames Street
1842		Towerzey, Alfred............	35, Glasshouse Street, W.
1857	61	Trask, Thomas	14, Albany Street
1853		Tupholme, John T.	38, Lamb's Conduit Street
1859	222	Turner, Charles E.	63, Gt. Russell Street, Bloomsbury
1853		Turner, Richard	2, Oxenden Street, Haymarket
1853		Tustin, Thomas H.	London Hospital
1842		Twinberrow, William	2, Edward Street, Portman Square
1864	713	Umney, Charles	40, Aldersgate Street.
1852	90	Urwick, William W.........	60, St. George's Road, Pimlico
1857	357	*Vizer, Edwin B.	63, Lupus Street, Pimlico
1841		*Wagstaff, John Henry......	James Street, Westbourne Terrace
1842		Walker, Alexander	10, Ireland Row, Mile End
1842		*Walker, Henry...............	44, Bernard Street, Russell Square
1845		Ward, Francis	14, Grosvenor Street
1846		*Warner, Charles Heath ...	55, Fore Street
1856	110	Watts, Henry Thomas ...	107, Edgeware Road
1853		Watts, John	75, Hampstead Road
1844		Watts, William.	3, Gray's Place, Brompton
1853		Watts, William M.	32, Whitecross Street
1841		Waugh, George	177, Regent Street

Year of Membership.	No. of Certificate.	NAME.	ADDRESS.
1853		Wegg, William	10, North Place, Ball's Pond Road
1842		Westwood, Robert	16, Newgate Street
1842		Westwood, William H.	16, Newgate Street
1854	321	Wheeler, Christopher	56, Hackney Road
1846		Wheeler, James E.	Barnsbury
1853		*Whitburn, Augustus R.	174, Regent Street
1852		White, Daniel	19, Park Terrace, Regent's Park
1841		White, Edmund	19, Park Terrace, Regent's Park
1842		Wilkes, George	1, Hayfield Place, Mile End
1853		Wilkinson, William	114, Lambeth Walk
1851		Williams, John	5, New Cavendish Street
1864		Williams, Joseph John	Harrow Road
1854	329	Williams, Terrick J.	13, Tichborne Street
1844		Willmott, William	83, High Street, Southwark
1857		Willows, John	101, High Holborn
1844		Wilson, Joseph	20, Sussex Street, Warwick Square
1853		Wilson, Thomas	Upper Holloway
1853		Windle, William	48, Portman Place
1852	111	Wood, Edward	
1842		Wooldridge, John	290, Euston Road
1855	364	*Wrangham, John	Stockwell
1859		Wright, George Henry	7, Poultry
1853		Wright, William V.	11, Old Fish Street
1842		Wyman, John	122, Fore Street
1858	294	*Yarde, Giles	28, Lamb's Conduit Street
1842		Yates, Benjamin	25, Budge Row, Cannon Street
1859	443	*Yates, Francis	100, Upper Thames Street
1852		Young, Frederick	137, Minories
1853		Young, George	12, Ebenezer Terrace, Mill Wall
1859		Young, William Herbert	35, Baker Street

COUNTRY MEMBERS.

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1846		Abbott, John Thomas	Darlington
1853		Abraham, John	Liverpool
1852		Ackerman, Theophilus	Bristol
1845		Ackrill, George	Abergavenny
1847		Acton, George	Worcester
1853		Adams, John	Loughborough
1853		Adams, Jonathan Henry	Stoke-on-Trent
1853		Adkins, Henry James	Birmingham
1849		Ainslie, William	Edinburgh
1852		Aitken, William	Edinburgh
1849		Albright, Henry	Liverpool
1853		Aldridge, Alexander John	Brighton
1852		Alexander, James	Greenock
1862	658	*Allan, Bruce	Edinburgh
1861	620	*Allan, William	Dumfries
1848		Allanson, Charles	Harrogate
1853		Allen, Adam U.	Lymington
1843		Allen, George	Ampthill
1859	555	*Allen, James Hore	Tottenham
1847		Allen, Thompson	Boston
1853		Allis, Francis	Teignmouth
1853		Alpass, Horace S.	Liverpool
1842		Amoore, Charles	Hastings
1858	400	Amos, Daniel	Canterbury
1853		Anderson, Charles Thomas	Jersey
1852	119	Anderson, James	Musselburgh
1862	477	*Andrew, Leyshon	Swansea
1853		Andrew, William	Aberdeen
1841		Andrews, John Betts	Clare
1853		Andrews, Thomas William Cox	Norwich
1854	375	*Anness, Samuel Richard	Ipswich
1841		Anthony, Jacob	Bedford
1862	533	*Anthony, John Lilley	Bedford
1865	753	Appleton, Robert	Hawthorn, Victoria
1853		Archer, Thomas	Southam
1841		Argles, Henry	Maidstone
1858	268	Argles, John	Maidstone
1841		Armstrong, Henry	Preston
1853		Arnold, Adolphus	Guernsey
1841		Arnold, Edward	Norwich
1842		Arthy, Joseph	Peterborough
1853		Ash, James Freer	Wiveliscombe
1853		Ashton, John Swan	Leicester
1864	510	*Ashton, John	Belper
1853		Ashton, William	Southport
1853		Aslin, John	Sunderland
1846		Asling, Brelsford	Spalding
1859	457	Atherton, John Henry	Nottingham
1861	419	*Atkins, Ernest	Deptford
1846		Atkins, Francis Thomas	Woolwich

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1842		Atkins, Francis Thomas	Deptford
1853		Atkins, Samuel Ralph	Salisbury
1855	420	*Atkinson, Matthew	Southport
1853		Atkinson, Richard Marshall	Leeds
1842		*Atkinson, Stephen	Doncaster
1850		Aubin, James	Jersey
1853		Backhouse, William	Leeds
1844		Badcock, John	Barnard Castle
1841		Baildon, Henry C.	Edinburgh
1852		Baildon, William	Edinburgh
1853		Bailey, Richard	Penrith
1858	431	Bailey, Richard	Wantage
1841		Bailey, William	Wolverhampton
1845		Baines, Richard	Blackburn
1850		Baker, Charles Patrick	Chelmsford
1861		Baker, Garrad	Chelmsford
1841		Baker, William	Chelmsford
1852		Baker, William	Twickenham Green
1842		Baker, William	Retford
1864	768	Balkwill, Alfred P.	Plymouth
1855	391	*Balkwill, Frederick Pryor	Plymouth
1844		Ball, George Vincent	Banbury
1841		Ball, Joseph	Oxton, nr. Birkenhd.
1842		Ballard, Edwin	Farringdon
1842		Ballard, William	Abingdon
1850		Balls, George	Deptford
1845		Bally, Edward F.	Baldock
1859	295	Baly, James	Warwick
1848	12	Bancroft, John James	Ruthin
1859	509	Banfield, Harold	Walthamstow
1841		Banks, Morris	Birmingham
1859	484	*Banner, Samuel	Liverpool
1853		Barber, George	Liverpool
1845		Barclay, John	Falmouth
1853		Barker, Joseph	Sudbury
1846		Barling, Thomas	Weymouth
1853		Barlow, Samuel	Darlington
1841		Barnes, James	Preston
1850		Barnett, William	Brighton
1853		Barnish, Edwin H.	Wigan
1853		Barritt, George	Croydon
1849		Barron, William	Cheltenham
1853		Barry, Edwin	Northampton
1853		Barry, James	Northampton
1861	256	Barry, Thomas	Ealing
1853		Barstow, Charles H.	Spofforth
1853		Barton, Charles	Brighton
1847		Barton, Henry	Brighton
1842		Bass, William Thomas	Enfield
1846		Bassett, Charles	Pontypridd
1853		Batchelor, Charles	Fareham
1853		Bateman, John Bird	Manchester
1861	243	Bates, James	Wellington
1850		Bates, William I.	Macclesfield

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1853		Bath, Richard C.	Devonport
1842		Battle, John Richard	Lincoln
1841		Baumbrough, William	Wandsworth
1855	207	Baxter, William Walmisley	Bromley
1841		Baynes, James	Hull
1858	402	Baylis, Thomas	Worcester
1861		Beach, James	Bridport
1847		Beadon, John	Taunton
1852		Beard, James	Manchester
1842		Beardsley, John	Nottingham
1853		Beaumont, William H.	Gravesend
1847		Beckett, John	Scarborough
1841		Beech, Joseph	Atherstone
1844		Beesley, Thomas	Banbury
1853		Bell, Edward C.	Dudley
1857	280	Bell, Francis	Bradford
1857	168	Bell, James	Manchester
1862		Bell, William	Carlisle
1842		Bennett, George	Newark
1850		Bennett, John W.	Leigh, Lancashire
1865	816	Berridge, Alfred	Leicester
1847		Berry, Edward	Gloucester
1853		Berry, Henry James	Worthing
1853		Bettison, Joseph	Chesterfield
1853		Betts, John	Woodbridge
1847		Bevan, Charles F.	Harwich
1855	270	Biggs, Walter	Hampstead
1865	817	Bing, Edwin	Cambridge
1865	760	Bingley, John	Northampton
1853		Binns, Samuel	Sheffield
1863	622	*Birch, Henry Cooper	Upper Norwood
1842		Birch, Thomas Edwards	Mold
1842		Bird, Alfred	Birmingham
1841		Bishop, Robert	Eye
1849		Bishop, Thomas	Woolwich
1853		Black, James	Leven
1842		Blackburn, Bailey	Bradford
1852		Blacklock, Henry	Bournemouth
1841		Blacklock, Joseph D.	Brighton
1845		Blackshaw, Thomas	Burslem
1842		Blades, Christopher	Leek
1846		Blades, Holland	Nantwich
1842		Blades, Sherriff	Northwich
1856		Blake, William F.	Stroud
1857		Bland, John Handel	Stourbridge
1852		*Blanshard, George	Edinburgh
1853		Blanshard, Thomas	Edinburgh
1848		Bloor, Joseph	Derby
1853		Blunt, Thomas	Shrewsbury
1842		Bolton, Thomas	Tenterden
1850		Bond, Charles	Kidderminster
1842		Bond, John	Great Yarmouth
1842		Bond, John	Minehead
1853		Bond, Laurence V.	Tiverton

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1848		Boocock, John	Leeds
1852	116	Boorne, Charles	Bristol
1853		Booth, James	Blackburn
1841		Booth, James	Rochdale
1842		Booth, John	Heckmondwike
1853		Booth, Thomas Buckley	Eccles
1859	332	Borland, John	Kilmarnock
1853		Bostock, William	Ashton-u.-Lyne
1855	304	Botham, William	Sheffield
1842		Bottle, Alexander	Dover
1863	495	*Boucher, John	Bristol
1849		Bowen, Henry F.	Brighton
1853		Bowerbank, Fawcett	Cockermouth
1841		Bowerbank, Joseph	Cockermouth
1847		Bowers, James D.	Chester
1843		Bowers, Thomas	Chester
1853		Bowker, James	Manchester
1853		Bowles, Charles A.	Chester
1858	29	Bowman, William	York
1863	209	Boyce, George	Chertsey
1853	257	*Boyce, John Pierce	Windsor
1841		Boyce, John Pierce	Chertsey
1842		Braddock, William	Oldham
1856	411	*Brady, Henry B.	Newcastle-on-Tyne
1853		Bragg, William B.	Market Harborough
1842		Brailey, Charles	Heavitree
1849		Bramwell, George	Liverpool
1863	683	*Bray, John	Sheerness
1842		Brayshay, William Bolam	Stockton
1842		Brearey, William A.	Douglas
1846		Bremner, William	Thurso
1845		Brend, Thomas	Swansea
1858	272	Breton, Walter	Brighton
1858	428	*Brevitt, William Y.	Wolverhampton
1842		Brew, Thomas Archer	Brighton
1864		Brewster, Godfrey Watson	Cambridge
1853		Brierley, Richard	Stalybridge
1842		Briggs, James	Tipton
1863	611	Briggs, James Aston	Wolverhampton
1843		Bright, Philip	Brecon
1853		Bright, William	Bath
1842		Brocklehurst, James	Hyde
1853		Bromfield, Charlés	Exeter
1853		Bromfield, William	Crewe
1848		Bromley, Charles	Liverpool
1842		Brown, Charles	Belper
1852	121	Brown, David R.	Edinburgh
1864	707	Brown, George	Sandown, I. W.
1853		Brown, George	Selby
1853		Brown, Samuel	Coningsby
1853		Brown, Thomas Dudley	Coventry
1850		Brown, Thomas	Lutterworth
1853		Brown, Thomson	Glasgow
1846		Brown, William	Dunfermline

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1862	612	*Brown, William Henry	North Shields
1845		Brown, William Scott	Manchester
1847		Bryant, William	Huntingdon
1853	226	Bryce, James	Dunfermline
1864	736	Buchanan, James	Edinburgh
1864	739	Buck, Jonathan Marsden	Liverpool
1853		Buck, Richard C.	Dudley
1853		Bullus, William	West Bromwich
1853		Bunn, Charles	Colchester
1842		Burdon, John	Durham
1848		Burdwood, James	Plymouth
1851		Burgess, William	Northwich
1853		Burnett, Robert	Frazerburgh
1853		Burrell, George	Montrose
1853		Burrow, John Severn	Great Malvern
1852		Burrow, Walter B.	Great Malvern
1860	598	*Burton, John	Nottingham
1853		Bustin, William	Shotley Bridge
1852		Butcher, Thomas	Cheltenham
1841		Butler, Samuel	Bristol
1853		Butler, Thomas E.	Leicester
1861	627	Buzzard, Thomas Hardy	Leicester
1853		Caddick, John	Newcastle-u.-Lyne
1853	77	Caley, Albert Jarman	Norwich
1842		Calvert, James	Belper
1849		Calvert, Robert	Stokesley
1865	828	Cameron, William	Kelso
1852	122	Carmichael, Lauchlan	Edinburgh
1842		Carr, William	Leicester
1841		Carr, William Graham	Berwick
1844		*Carran, Thomas	Peel, Isle of Man
1853		Carruthers, Richard Birrell	Dumfries
1850		Carter, William	Manchester
1844		Cartwright, William	Newcastle-u.-Lyne
1852		Cattle, James	Liverpool
1853		Chamberlin, William	Downton
1846		Chaplin, Alfred	Brighton
1855	62	*Chaplin, John Lambert	Colchester
1853		Chapman, William F.	Hull
1853		Chapman, Henry	Clevedon
1853		Chapman, Henry	Ipswich
1853		Chapman, John	Tring
1849		Chapman, Richard J.	Chipping Ongar
1841		Chater, Jonathan	Watford
1853		Chaundy, Thomas G.	Oxford
1842		Chave, John Anstey	Uxbridge
1849		Cheshire, John	Grantham
1862	671	*Chessall, Rolwand	Sidmouth
1853		Childs, James L.	Southsea
1842		Chipperfield, Robert	Southampton
1859	487	*Chrispin, William	Darlington
1842		Christopher, William	Crickhowell
1861	583	Church, Henry James	Cambridge
1853		Churchill, John	Birmingham

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1856		Churchouse, William B.	Chard
1863	547	*Clark, John	Stockton-on-Tees
1845		Clark, John Webster	Leicester
1853		Clark, Robert	Devizes
1855	334	Clark, William W.	Dorking
1853		Clarke, Benjamin Joseph	Cheltenham
1841		Clarke, Joseph	York
1846		Clarke, Thomas Meadows	Richmond
1860	200	Clarke, William R.	Northampton
1853		Clater, Francis	Retford
1841		Clay, Robert	Liverpool
1864	599	*Clayton, Henry	Eastbourne
1854	201	Clayton, John O.	Leeds
1853		Clennell, John Morton	Newcastle-on-Tyne
1849		Clift, Edward	Lewisham
1853		Clift, Joseph	Dorking
1858		Coates, John M.	Newcastle-on-Tyne
1845		*Coates, William	Leeds
1852		Cochrane, Thomas	Falkirk
1842		Cocking, George	Ludlow
1853		Cockton, John	Maryport
1841		Colbeck, George Royde	Leamington
1865	613	*Colby, John	Brighton
1848		Cole, Walter Thomas	Weymouth
1853		Collier, William	Sheffield
1846		Collier, William	York
1859		Collier, William Lindsey	Reading
1849		Collings, William Henry	Bristol
1852		Colton, Thomas	Selby
1853		Commans, Robert Dyer	Bath
1853	185	Conacher, David	Markinch
1842		Conway, William	Pontypool
1843		Cooke, William	Norwich
1841		Cooper, George	Exeter
1850		Cooper, George Brown	Brightlingsea
1852		Cooper, James Robert	Ashbourne
1853		Cooper, Lewis	Reading
1845		Cooper, Mark Ward	Bridlington
1841		Cooper, Thomas	Leicester
1845		Cooper, Thomas	York
1853		Corfield, Thomas J. T.	St. Day
1843		Cornelius, Richard Bussell	Teignmouth
1859	469	*Cornell, William	Ipswich
1845		Cornish, Henry Roberts	Penzance
1843		Cornish, William	Brighton
1841		Cortis, Charles	Worthing
1853		Cotterell, William Henry	Dover
1864	367	Cotton, John Lovering	Barnstaple
1853	194	Coupland, Henry	Liverpool
1853		Coupland, Joseph	Harrogate
1842		Cousins, Thomas George	Oxford
1842		Coverley, John	Scarborough
1845		Cowell, Silas	Canterbury
1841		Crafton, Ralph Caldwell	Croydon

Year of Member-ship.	No. of Certificate.	NAME.	RESIDENCE.
1853		Crarer, John	Blairgowrie
1853	228	Crick, George Edward	Maldon
1853		Cripps, John	Hammersmith
1842		Critchley, John	Blackburn
1842		Crocker, Henry Radcliffe	Brighton
1853		Crofts, Holmes Cheney	Chatham
1852	124	Croley, William	Edinburgh
1841		Crook, George	Farnham
1853		Croskell, Charles	York
1847		Cross, William Gower	Shrewsbury
1858	432	*Cross, William	Cardiff
1853		Crowder, Charles H.	Barton-on-Humber
1846		Crowther, Thomas	Tickhill
1851		Cuff, Robert C.	Bristol
1853		Cumine, Frederick H.	Southport
1841		Cupiss, Francis	Diss
1853		Currie, John	Glasgow
1865	807	Currie, John	Glasgow
1863	693	Curtis, William	Barnstaple
1854	273	Cuthbert, John Mason	Bedford
1863	470	Cutting, James	Leamington
1842		Cutting, James Bray	Leamington
1864	590	Cutting, Thomas John	Selby
1853		Cutts, Thomas	Basford
1865	351	Daines, Thomas	Kaffraria
1842		Dale, George	Chichester
1844		Dale, William James	Portsea
1855		Dance, William D.	Stourport
1853		Dandie, David	Perth
1855	126	Dandie, Robert	Perth
1850		Davenport, Edward	St. Albans
1853		Davidson, Charles	Aberdeen
1846		*Davidson, John	Berwick
1861	552	Davies, David	Cardigan
1853		Davies, John L.	Hay
1853		Davies, Peter Hughes	March
1842		Davies, Richard Morgan	Carmarthen
1865	826	Davies, Moses Prosser	Tenby
1853		Davies, William Henry	North Petherton
1856		Davis, D. Frederick	Leominster
1841		Davis, Henry	Leamington
1841		Davis, John	Dorchester
1848		Davis, John Oliver	St. Leonards
1859	282	Davis, Richard Hayton	Harrogate
1841		Davis, Robert	Dorchester
1845		Davison, Ralph	York
1854		Dawe, Sampson	Monmouth
1853		Dawson, Thomas	Preston
1853		Day, George	Blackheath
1853	194	Deck, Arthur	Cambridge
1845		Dennison, Matthew	Dudley
1860	523	*Deighton, Thomas Milner	Bridgnorth
1863	564	*Delf, Frederick Daniel	Liverpool
1852		Dewar, Peter James	Dingwall, N.B.

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1842		Dickerson, Henry	Devonport
1845		Dickins, Rowland	Aylesbury
1847		Dingley, Richard Loxley	Evesham
1858	460	*Dixon, Henry	Ryde, Isle of Wight
1854	381	*Dixon, William	Southampton
1842		Dobinson, William	Sunderland
1865	791	Dobinson, William L.	Bishopwearmouth
1853		Dobson, James	Keswick
1858		Dobson, John	Newcastle-on-Tyne
1847		Dodman, Robert	Thorney
1842		Dodshon, Edward	Sunderland
1852		Done, John	Manchester
1846		Doubell, James	Broadstairs
1855		Doughty, Richard	Bushey Heath
1842		Dowell, William Cuming	Bristol
1845		Dowman, George	Southampton
1847		Down, Richard Haydon	Torpoint
1853		Downes, Joseph	Lower Mitcham
1847		Downing, Joseph G.	Braintree
1841		Drage, William F.	Birmingham
1841		Dresser, Richard	York
1841		Duck, Daniel	Guisborough
1846		Dudden, Richard M.	Midsomer Norton
1852		*Dudgeon, George	Nottingham
1842		Duggan, Henry Stephen	Hereford
1863		Dulley, Joseph	Wolverhampton
1842		Duncan, Frederick McRae	Sandwich
1841		Duncan, John	Edinburgh
1853	184	Duncan, William	Rothesay
1842		Dunhill, William	Doncaster
1861	539	*Dunhill, William Workman	Doncaster
1861	500	Dunn, James	Newcastle-on-Tyne
1853		Duprey, Jean A. B.	Jersey
1853		Durant, Frederic	Dorking
1842		Dutton, George	Bolton
1847		Dutton, John	Rock Ferry
1853		Dyer, John	Margate
1853		Dyer, William	Halifax
1852	64	Dymond, George	Birmingham
1842		Dyson, John	Andover
1842		Earee, Thomas	Staines
1842	568	*Earle, Francis	Hull
1853		Eastes, Thomas Henley	Dover
1853		Edgar, James	Henley-on-Thames
1859	324	Edman, Bonner	Henley-on-Thames
1853		Edmonds, Benjamin M.	Lowestoft
1842		Edwards, George	Dartford
1850		Edwards, Henry	Lincoln
1848	22	*Edwards, John Baker	Liverpool
1853		Edwards, William	Denbigh
1861	628	*Edwards, William	Much Wenlock
1863	645	*Ekin, Charles	Bath
1853		Ekins, William	Huntingdon
1842		Eliott, Samuel	Liskeard

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1862	618	*Elliott, Robert	Gateshead
1842		Ellis, Benjamin	Shepton Mallett
1849		Ellis, Richard	Thornbury
1853		Ellis, William	Abergele
1856	258	*Elsey, Charles	Maldon
1845		Elsey, John	Horncastle
1847		Ely, George	Hockley
1843		*England, William Paul	Huddersfield
1853		Ereaut, George	Jersey
1848		Ereaut, John	Jersey
1860	553	*Ereaut, John, jun.	Jersey
1860	493	Essery, William	Plymouth
1842		Evans, Edward	Liverpool
1858	211	Evans, Evan	Aberavon
1854	47	Evans, Henry S.	Liverpool
1853		Evans, Samuel	Caerphilly
1847		Evans, Thomas	Aberdare
1851	43	Evans, Thomas	Liverpool
1853		Evans, William Luke	Cardiff
1842		Eyre, Benjamin A.	Ipswich
1862	462	Eyre, Joshua J.	Manchester
1849		Eyre, Thomas S.	Launceston
1844		Fairbank, James Hack	Woolwich
1853	361	Fairbarn, George	Liverpool
1853		Fairley, Thomas	Sunderland
1853		Falkner, Richard	Banbury
1847	26	Farmer, James	Castle Donnington
1842		Farmer, John	Putney
1865	818	Farnsworth, Thomas	Codnor
1853		Farnworth, William	Blackburn
1853		Farrage, Robert	Rothbury
1850		Farrant, Henry	Ottery St. Mary
1842		Farrant, Robert	Salisbury
1842		Fergusson, John	Liverpool
1842		Finch, John	Cheltenham
1852		Finlayson, Thomas	Leith
1853		*Fisher, Henry Christopher	Torquay
1863	652	*Fisher, Francis Dixon	Boston
1853		Fiske, Charles	Ipswich
1843		Fitch, Robert	Norwich
1842		Fitt, Edward	Barking
1865	770	Fitzhugh, Richard	Nottingham
1841		Fleeming, William	Wolverhampton
1842		Fletcher, Francis	Cheltenham
1841		Flockhart, William	Edinburgh
1863		Flooks, Thomas Howse	Sherborne
1853		Flower, Thomas S.	Cheshunt
1841		Forbes, William	Reigate
1858	445	Ford, Charles	Blackheath Road
1853		*Forge, Christopher	Bridlington
1853		Forman, George	Birmingham
1853		Forrest, Richard William	Gainsborough
1853		Forster, John	Whitehaven
1845		Forster, Robert	Dover

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1853		Foster, Alfred Hood	Birmingham
1842		Foster, Edward	Ludlow
1855		Foster, George Pitt	Tetbury
1853		Foster, John	Uckfield
1842		Foulds, William	Chowbent
1859	421	*Fouracre, Robert	Taunton
1853		Fowler, Edward	Bedale
1853		Fowler, Henry	Torrington
1849		Fox, Charles James	Witney
1853		Foxcroft, Elijah	Skipton
1857		Francis, George	Great Malvern
1865	808	Francis, John	Wrexham
1853		Franks, Alfred	Ramsgate
1853		Fraser, Charles	Largs, N.B.
1853		Frazer, Daniel	Glasgow
1853		Freeland, John	Barrhead
1844		Freestone, Thomas Morris	Bristol
1841		French, Gabriel	Chatham
1853		Fresson, Lewis Francis	Stevenage
1862	641	*Frost, George	Derby
1851		Frost, William Henry	Collumpton
1841		Fryer, Henry	Huddersfield
1849		Furmston, Samuel C.	Wycombe
1863	53	Furze, Henry	Forest Hill
1853		Gall, Benjamin D.	Woodbridge
1842		*Gamble, Richard	Grantham
1853		Gammidge, Samuel	Leicester
1841		Garbutt, Cornelius	Gateshead
1853		Garbutt, Cornelius D.	Gateshead
1842		Gardener, Charles	Tunbridge Wells
1841		Gardner, James	Edinburgh
1853		Garland, William	Leeds
1841		*Garle, John	Bromley, Kent
1853		Garlick, John	Hollinwood
1851		*Garnham, Barrington	Brighton
1842		Garratt, John Colpman	Rugby
1856		Garratt, Samuel	Rugby
1842		Garside, Francis Burdett	Southport
1842		Gay, George	Stroud
1846		Geldard, John	St. Austell
1842		Geldard, Richard Kelly	Plymouth
1862	650	*George, John Evan	Hirwain
1861	403	Gibbons, George	Weston-super-Mare
1864	773	Gibbons, Thomas G.	Manchester
1841		Gibbons, William	Plymouth
1852		Gibbs, William	Ryde
1851		Gilbert, George	Portsea
1861	570	*Gilbert, George Fagge	Burwash
1853		Gibson, Robert	Salford
1864	569	*Giddings, William Henry C.	Luton
1841		Giles, Richard Bobbett	Clifton
1847	37	*Giles, Richard William	Clifton
1859	471	*Gill, Hugh	Boston Spa
1842		Gill, Samuel	Pendleton

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1842		Gill, William	Tavistock
1841		Gilkes, William	Leominster
1856	433	Gissing, Thomas W.	Wakefield
1844		Glaisby, John	York
1841		Glaisyer, Thomas	Brighton
1852	71	Glanfield, George	Torquay
1859	458	*Glass, John T.	Bournemouth
1853		Glew, William	Selby
1850		Glover, Samuel	Liverpool
1841		Gloyne, Thomas Hadfield	Dewsbury
1858		Glyde, John William	Blandford
1845		Goddard, Henry Edward	Yarmouth
1842		Goddard, Joseph	Leicester
1865	784	Goldfinch, George	Hendon
1850		Goodall, Henry	Derby
1842		Goodall, Thomas	Eynsham
1857	79	Goode, Charles	Congleton
1857		*Goodwin, John	Lower Clapton
1842		Gordelier, Paul William Gibbs	Sittingbourne
1853		Goss, Samuel	Barnstaple
1853		Gostling, Thomas P.	Diss
1853		Gould, Frederick	Kingston-on-Thames
1855	132	Govan, Alexander	St. Andrews
1841		Gow, Alexander	Wolverhampton
1857		Granger, Edwin John	Upper Clapton
1852	130	Gray, Alexander F.	Edinburgh
1853		Gray, Charles	Bilston
1848		Gray, William	Rothwell
1853		Greaves, Abraham	Ironville
1844		Greaves, John	Bakewell
1842		Greaves, Richard	Ripon
1854	245	Green, James	Droitwich
1848		Green, John	Birkenhead
1863	446	*Green, John	Deal
1853		Green, Robert Poynton	Witham
1849		Greenwell, William C.	Gateshead
1848		Greenwood, John	Harrogate
1861	609	*Gregory, George Henry	Taunton
1853		Greig, William	Glasgow
1846		Griffith, Richard	Slough
1852		Griffith, Robert	Carnarvon
1861		Griffiths, Benjamin	Swansea
1853		Griffiths, William	Swansea
1855	18	*Grindley, Robert D.	Wandsworth
1865	624	*Grindley, William	Chester
1853		Groom, William Bishop	Liverpool
1852		Grounds, George Field	Bishop Stortford
1853	103	Groves, Thomas Bennett	Weymouth
1854	95	Groves, Wellington E.	Blandford
1853		Gudgen, George B.	Kimbolton
1865	801	Guest, Edward P.	Brentwood
1842		Gulliver, Walker Job	Chester
1860	369	Guyer, James Brett	Torquay
1841		Gwatkin, James Thomas	Brighton

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1852		Gwillim, John Cole	Malvern Link
1853		Hackman, Leonard L.	Landport
1853		Hadfield, John	Congleton
1841		Hadfield, William	Congleton
1853		Hadfield, William P.	Newark
1852		Haigh, Joseph	Leeds
1842		Haines, John Jenkins	Bromsgrove
1842		Hall, George	Huddersfield
1853		Hall, Henry R. F.	Hull
1842		Hall, John Dean	Wycombe
1852	4	Hall, John Richard	Canterbury
1843		Hall, Joseph	Salford
1853		Hall, Richard	Brecon
1853		Hall, Robert	Camborne
1849		Hall, Thomas	Grantham
1853		Hall, Thomas	Newcastle-on-Tyne
1849		Hallam, Edward	Axbridge
1859	536	Hallaway, John	Carlisle
1860	434	*Halliday, William Jabez	Manchester
1853		Ham, John	Nether Stowey
1857		Hambrook, John B.	Dover
1841		Hambrook, Odden	Dover
1858		Hamilton, John T.	Dublin
1853		Hamilton, Julius	Poole
1846		Hammon, Richard	Folkestone
1864	731	Hamp, John	Wolverhampton
1864	781	Hampson, Robert	Alderley Edge
1855	383	Handley, John	Wakefield
1853		Hannell, Edward W.	Rugby
1853	230	Hardie, James	Dundee
1853		Harding, James John	Sudbury
1853		Hardman, Thomas B.	Liverpool
1853		Hare, Josiah William	Harleston
1852		Hargraves, Henry L.	Oldham
1842		Harold, William	Battle
1842		Harper, Henry	Leamington
1852		Harrington, Arthur	Rochford
1853		Harrington, Richard B.	Rayleigh
1853		Harris, Daniel R.	Sydenham
1854	203	Harris, William Harry	Northampton
1842		Harrison, James Parker	Carlisle
1853		Harrison, Thomas	Leeds
1842		Harrison, Thomas	Bradford
1847		Harrison, Thomas	Nottingham
1842		Harsant, William	Epsom
1853		Hart, George William	Hull
1852		Hart, Hugh	Glasgow
1848		Hart, James	Bolton
1841		Hartland, James	Bristol
1863	563	*Hartley, William	Warrington
1843		Harvey, John	Newark
1865	785	Harvey, Sidney	Canterbury
1841		Harvey, Thomas	Leeds
1842		Haselar, Albert	Cranbrook

Year of Member-ship.	No. of Certificate.	NAME.	RESIDENCE.
1861	632	*Hasselby, Thomas John	Goole
1848		Hatfull, Robert	Deptford
1853		Hatrick, Robert R.	Paisley
1853		Hatrick, William	Paisley
1853		Hawkins, Henry Ford	Rugeley
1847		Haydon, Frederick Walter	Fordingbridge
1842		Haydon, William H.	Tiverton
1857	447	*Hayes, James	Great Warley, Essex
1853		Hayman, Alfred	Neath
1853		Hayward, Charles	Manchester
1859	541	*Hayward, Charles John	Lincoln
1845		Hayward, Edward	Ipswich
1853		Hayward, Samuel Henry	Gloucester
1845		Hayward, William G.	Reading
1842		Head, John	Lewes
1842		Headley, Morris	Bridlington Quay
1846		Heald, William	Sleaford
1864	770	Heanley, Marshall	Peterborough
1845		Heathcote, Thomas Sarl	Newcastle-under-Lyne
1847		Heaton, John Scholes	Manchester
1842		Hellowell, Daniel	Leeds
1853	285	Heming, Robert	Sunderland
1853		Henderson, John	Glasgow
1853		Henley, Henry	Lyme Regis
1853		Henshall, John	Congleton
1841		Henson, Matthew	Dunstable
1853		Henthorn, Joshua	Oldham
1853		Herington, Joseph	Leighton Buzzard
1845		Hern, William Henry	St. Austell
1853		Hewlins, Edward	Leatherhead
1842		Hibbert, Walter	Neath
1846		Hick, Allan	Wath-upon-Dearne
1845		Hick, Joseph	Bradford
1845		Hick, Matthew Bussey	Wakefield
1842		Hickman, Joseph Frederick	Newbury
1853		Hicks, George	Rothesay
1864	716	Hicks, James Sellick	Looe
1853		Hifley, Richard James	Devonport
1853	96	Higgins, Thomas S.	Huddersfield
1843		Higgins, William	Chester
1842		Highway, Henry	Walsall
1841		Hill, John	Sheffield
1842		Hill, Richard	Bruton
1853		Hill, Simon	Plymouth
1854	246	Hill, Thomas	Norwood
1853		Hill, William	Ardwick
1853		Hinchliffe, Ferrand G. U.	Manchester
1853		Hinds, James	Coventry
1853		Hine, Alfred	Beaminster
1858		Hingston, Andrew H.	Liverpool
1853		Hipkins, Matthew	Birmingham
1842		Hitchcock, Charles Edmund	Oxford
1853		Hobson, Charles	Beverley
1864	762	*Hodder, Alfred	Clifton

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1847		Hodder, Henry	Bristol
1853		Hoddy, Benjamin	Halstead
1852	133	Hodgeton, David	Brechin
1841		Hodgson, Edward	Stockton
1853		Hodkinson, Henry	Macclesfield
1865	822	Hogarth, William	Preston
1853		Hogg, Thomas	Bideford
1853		Holden, Richard	York
1853		Holdsworth, Thomas W.	Birmingham
1865	673	Holgate, Walter	Gateacre
1854		Holland, William	Market Deeping
1841		Hollier, Elliott	Dudley
1843		Holt, George Palmer	Bexley Heath
1853		Holt, Richard Wylde	Seacombe
1865	802	*Holt, William H.	Altrincham
1853	13	Hooker, Thomas E.	Wellington
1842		Hooper, Henry	Brighton
1853		Hopper, Richard	Sunderland
1841		Hopwood, Henry J. S.	Richmond, Surrey
1860	404	Hopwood, Thomas S.	Richmond, Surrey
1841		Horncastle, Henry	Sheffield
1841		Horner, Stephen	Hartlepool
1857	174	Hornsby, George G.	Cheltenham
1845		Hornsby, John Harwood	Odiham
1853		Horsey, James	Portsea
1851		Houghton, James	Liverpool
1853		Houghton, Thomas	Oxford
1859	448	*Houghton, William	Preston
1856	214	Houlton, James	Wetherby
1853		Howard, John Eliot	Stratford-le-Bow
1841		Howard, Robert	Stratford-le-Bow
1853		Howard, Richard	Tunbridge Wells
1842		Howman, Philip	Winchcombe
1846		Howorth, James	Doncaster
1855		Howson, Thomas J,	Gateshead
1853		Hubbard, Robert William	Kenilworth
1851	10	Huggins, George Thomas	Barnet.
1849		Hughes, Edward	Altrincham
1864	694	*Hughes, Roger	Denbigh
1842		Hughes, Samuel	Stourbridge
1842		Hulbert, Robert Skeat	Basingstoke
1853		Hulme, John Hughes	Norwich
1842		Humphreys, Matthew	Nottingham
1842		Humphreys, Thomas	Birmingham
1855	104	*Hunt, Richard	Winchester
1851		Hunt, Thomas	Stockport
1853	135	Hunter, David	Edinburgh
1853		Hunter, John	Gosport
1855		Hurdon, James	Torrington
1853		Hurman, John	Bridgewater
1842		Hurst, John	Louth
1844		Hurst, William F. H.	
1842		Husband, Matthew	Exeter
1861	619	Hustwick, Thomas H.	Hereford

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1853		Iliffe, Thomas	Nuneaton
1853		Ingham, Henry	Wellingore
1853		Ingham, Richard H.	Manchester
1853	306	Isaac, George Washington	Clifton
1861	476	*Iverach, John G.	Kirkwall
1852		Iverach, William	Kirkwall
1854	136	Jaap, John	Glasgow
1853		Jackson, Henry	Liverpool
1841		Jackson, Thomas	Manchester
1852	105	Jackson, William	Crediton
1842		Jackson, William George	Hartlepool
1842		James, John	Truro
1864	653	*James, John	East Dereham
1853		James, John Parry	Cardiff
1853		Jameson, Walter C.	Bath
1865	819	Jarvis, William	New Brighton
1855	298	Jefferson, Ebenezer W.	Tottenham
1853		Jefferson, Peter	Leeds
1853		Jeffrey, Russell	Cheltenham
1853		Jenkins, John	Peterchurch
1862		Jenkins, Joseph	Nottingham
1859		Jenner, William M.	Sandgate
1855	286	Jennings, John Edgell	Southampton
1844		Jennings, John E. H.	Sheffield
1842		Jennings, Reginald	Hereford
1841		Jennings, William	Halifax
1853		Jessop, Jonathan	Halifax
1852		Jobson, William	Dundee
1858	390	Johnson, George	Birmingham
1853		Johnson, John B.	Uttoxeter
1841		Johnson, John H.	Liverpool
1841		*Johnson, Samuel	Liverpool
1853		Johnson, Thomas	Leek
1848		Jones, Charles	Birkenhead
1841		Jones, Charles	Hanley
1863	578	Jones, Charles William	Carmarthen
1853		Jones, David	Narberth
1842		Jones, Edward Bowen	Carmarthen
1853		Jones, Ellis Powell	Rhyl
1859	465	Jones, Humphrey	Llangollen
1847		Jones, James	Newcastle-on-Tyne
1848		Jones, James	Salford
1853		Jones, John	Aberdare
1845		Jones, John	Holywell
1853		Jones, Owen Lewis	Liverpool
1845		Jones, Samuel Urwick	Leamington
1853		Jones, Thomas	Welshpool
1853		Jones, Thomas J.	Newport
1842		Jones, William	Hastings
1842		Jones, William	Liverpool
1841		Jones, William B.	Kingston-on-Thames
1853		Jones, William Thorpe	Southwell
1863	340	*Jones, Williams Withers	Bristol
1857	115	*Joy, Francis William	Cardiff

Year of Membership.	No. of Certificate	NAME.	RESIDENCE.
1859	473	Judd, William	Christchurch
1842		Judson, Thomas	Ripon
1846		Jull, Thomas	Horsham
1853		Keith, James	Aberdeen
1852	137	Kemp, David	Portobello
1841		Kemp, Grover	Brighton
1854		Kemp, John	Brighton
1848		Kemp, William	Horncastle
1841		Kendall, Frederick	Stratford-on-Avon
1844		Kendall, George	Masham
1853		Kennedy, William	Glasgow
1853		Kent, Alfred	Iffley
1861	601	*Kent, Frederick William	Bath
1863	710	Kerfoot, Thomas	Manchester
1853		Kernick, Samuel Penrose	Cardiff
1843		Kernot, Joseph	Naples
1847		Kershaw, James	Southport
1842		Kiddy, Samuel	Belper
1841		Kimbell, Henry	Knowle
1853		King, Charles Montague	Southend
1853		King, Ellis	Southend
1842		King, J. Raymond	Bath
1841		King, Thomas Simmons	Rochester
1853		King, William	Soham
1865	792	King, William	Huddersfield
1853		King, William George	Market Drayton
1858	234	Kinninmont, Alexander	Glasgow
1853		Kirk, Charles	Hartley Row
1854	276	Kirk, John	Maidstone
1853		Kirk, Thomas	Liverpool
1853		Kirkbride, William	Penrith
1847		Kirkham, Thomas	Bury St. Edmunds
1859	299	Kirkman, George B.	
1842		Kirton, Joseph B.	Hull
1853		Knapman, John	Exeter
1843		Knight, Alfred	Margate
1858		Knight, John	Cambridge
1854		Knight, Joseph	Bath
1863	667	*Knights, John Atmore	Norwich
1841		*Knott, Thomas	
1844		Knowles, Richard John	Demerara
1853	187	Laird, William	Dundee
1853		Lamotte, Thomas G.	Clifton
1853		Lancaster, Henry	Croydon
1853		Lane, Joseph	Hampstead
1842		Langford, William	King's Lynn
1858	100	Langman, Peter	Chatteris
1843		Lansdale, Ralph	Wycombe
1853		Laen, William	Pembroke Dock
1853		Lasham, John	Romford
1841		Lathbury, Robert	Liverpool
1842		Lavers, Thomas Howard	Blackheath
1853		Law, William	Forfar
1859	183	*Lea, Charles Wheeley	Worcester

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1842		Lea, Henry Clairmont	Hastings
1841		Lea, John Wheeley	Worcester
1853		Lea, Samuel	Ellesmere
1853		Leach, John	Crawley
1842		Leare, James	Sunbury
1855		Leadbetter, William Austin	Melton Mowbray
1841		Leay, Joseph	Chilcompton
1853		Leighton, John H.	Durham
1852	138	Leith, James	Edinburgh
1853	83	Lever, William	Brighton
1853		Lewin, Edward C.	Boston
1841		Lewin, William	Plymouth
1856	310	Lewis, Thomas Cooper	Rugby
1842		Lidington, George	Bilston
1857		Limon, Henry	Burgh
1847		*Lindo, Benjamin	Dover
1841		Lindsay, Robert	Edinburgh
1864		Ling, Edwin	Esher
1841		Lines, George	Hertford
1849		Linsley, Thomas	York
1844		Lister, George	Cottingham
1854	215	Littlefield, James Wavell	Ventnor, Isle of Wight
1853		Lloyd, Henry	Deptford
1853		Lock, William	Boston
1846		Lockyer, George	Deptford
1853		Loggin, Charles Frederick	Stratford-on-Avon
1862	585	Long, Alfred Thorby	Bognor
1858	479	Long, Henry	Croydon
1859		Long, William Elliot	Chichester
1853		Longfield, Joseph	Leeds
1853		Longrigg, John	Appleby
1853		Lord, Charles	Todmorden
1853		Lord, Ellis	Rochdale
1841		Lovett, John	Gloucester
1853		Lowe, Charles	Surbiton
1841		Lowe, Thomas	Liverpool
1842		Lowndes, Hervey	Stockport
1841		Loye, Philip	Plymouth
1865	786	Lucas, Joseph	Birmingham
1853		*Luff, William	Oxford
1853		Lumsden, James	Peterhead
1842		Mabson, William	Great Yarmouth
1852	139	Macfarlane, Wardlaw	Edinburgh
1853		McDiarmid, John B.	Deal
1864	737	Macdonald, John	Lasswade, N. B.
1864	738	Macfarlane, Andrew Yuile	Edinburgh
1852		Macintosh, Archibald	Rothesay
1841		Mackay, John	Edinburgh
1863	557	*Madgwick, William Butler	Andover
1853		Madge, James C.	Devizes
1848		*Maggs, Samuel Blount	St. Leonards
1845		Maggs, Thomas C.	Yeovil
1845		Maleham, Henry	Sheffield
1862		Manby, George	Southampton

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1842		Manfield, John W.	Salford
1853		Manifold, John J.	Weaverham
1859		Mann, Robert	Newcastle-on-Tyne
1841		Manthorp, Samuel	Colchester
1850		March, William	Newark
1845		Marder, James Wood	Lyme Regis
1857	481	*Maries, Henry Davies	Watford
1846		Marks, George	Bradford-on-Avon
1853		Marlor, Jabez	Lees, near Oldham
1849		Marrison, George O. R.	Tasmania
1845		Marsden, Joseph	Middleton-on-Tees
1842		Marsh, William M.	Sevenoaks
1842		Marshall, John Ferris	Gainsborough
1853	311	Marshall, Robert	Boston
1842		Marshall, James A.	Waltham Abbey
1841		Martin, John	Bristol
1842		Martin, Edward W.	Guildford
1845		Martin, Thomas	Lewes
1853		Martin, Thomas	Liverpool
1851		Martin, Henry G.	St. Albans
1853		Martyn, John Jones	Brighton
1842		Maskery, Samuel	Liverpool
1853		Mason, Joseph W.	Cirencester
1853		Mason, William	Hastings
1842		*Mason, William W.	Nailsworth
1853		Mather, William	Manchester
1853		Maunder, Alexander	Weston-super-Mare
1848		Maunder, Frederick	Sheffield
1853		Mawson, John	Newcastle-on-Tyne
1848		Maynard, Henry Robert	Brandon
1842		Mays, Robert James John	South Shields
1843		Meadows, John	Leicester
1842		Meatyard, Robert	Basingstoke
1842		Medcalf, Benjamin	Ware
1843		Medcalf, Ebenezer	Lower Tooting
1853		Medd, Joseph	Gloucester
1857	215	Medley, William	Derby
1853		Melhuish, John	Crediton
1862	392	Mercer, Nathan	Liverpool
1859	507	*Mercer, Nicholas	Fairfield
1865	787	Mercer, Thomas William	Rochdale
1850		Merrick, Thomas J.	Northampton
1853		Merryweather, Charles	Leicester
1854	106	*Metcalfe, Christopher L.	Hull
1861		*Metcalfe, John Sykes	Kendal
1853	621	Millais, Thomas	Jersey
1843		Miller, Robert P.	Reading
1853		Miller, John Thomas	Sheffield
1842		Miller, Charles	Oxford
1864	750	Mills, John	Chester
1847		Mitchell, John	Manchester
1862	605	*Mohun, Martin	Faversham
1842		Mole, William Tingey	St. Neots
1846		Monro, Henry L.	Newcastle-on-Tyne

Year of Member-ship.	No. of Certificate.	NAME.	RESIDENCE.
1863	579	*Moon, William Henry	Ilfracombe
1865	820	Morgan, Richard	Newtown, Montgomery
1853		Morgan, William	Pillgwinlly
1844		Morris, Alfred Philip	Stourbridge
1865	829	Morris, Thomas E.	New Brighton
1844		*Morse, George	Mortlake
1844		Morton, George	Stratford-le-Bow
1845		Morton, Henry	Ramsgate
1853		*Morton, Jamieson	Ramsbottom
1852		Morton, John	Durham
1849		Moss, William	Carlisle
1842		Mount, John	Longsight
1853		Mount, William	Canterbury
1853		Mousley, William	Redditch
1847		*Mumbray, Robert Goodwin	Richmond, Surrey
1853		Mumby, Charles	Gosport
1853		Munday, Edward Smith	Worthing
1853		Murdoch, David	Falkirk
1852		Murdoch, George	Glasgow
1849	63	Murdoch, James	Glasgow
1841		Muriel, Henry Brooke	Brighton
1842		Muskett, James	Harleston
1844		Musson, Telemachus G.	Birmingham
1848		Naftel, Thomas P.	Guernsey
1865		Napier, George L.	Exeter
1842		Napier, James	Edinburgh
1853		Narracott, Henry	Torquay
1842		*Negus, Samuel	Northampton
1864	659	*Nesbit, John	Portobello
1853		Newbery, Henry	Biggleswade
1853		Newby, William Henry	Perth
1853		Newcome, John	Grantham
1854		Newman, Robert	Bewdley
1845		Newman, Thomas	Hartley Row
1853		Newman, Walter F.	Falmouth
1847		Newton, Christopher	Ratho, N. B.
1853		Newton, George	Newcastle-on-Tyne
1853		Nicholas, John	Narberth
1861	513	Nicholson, John Joseph	Sunderland
1841		Nickolls, James	Stourbridge
1852		Nicol, George	Pulteney Town
1845		Nind, George	Wandsworth
1853		Nix, John K.	Billericay
1841		Noakes, Richard	Brighton
1858	522	Noble, Alexander	Edinburgh
1862	580	*Norrish, James	Wandsworth
1846		Northcroft, Jonathan	Plymouth
1853		Norwood, Thomas	Hastings
1842		Oakey, Joseph Malpas	Preston
1853		Oldham, William Thomas	Wisbeach
1853		Oliver, John	Liverpool, 19, St. James's Pl.
1862	637	*Olliver, George Edward	Cranley
1842		Orange, John	Portsea
1845		Owen, Griffith	Caernarvon

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1842		Owen, William	Newcastle-on-Tyne
1863	520	*Owles, Edward John	Aldeburgh
1845		Owles, James	Bungay
1842		Owles, John	Yarmouth
1842		Paine, William	Canterbury
1841		Palk, Edward	Southampton
1841		*Palk, John	Exeter
1853		Palmer, Charles Fielding	Birmingham
1847		Palmer, Faithful	Cheltenham
1842		Palmer, Thomas J.	East Grinstead
1842		Parker, Edward	Carlisle
1853		Parker, John	Birmingham
1853		Parker, Matthew	Bath
1841		Parker, Thomas	Halifax
1853		Parker, William Henry	Nottingham
1853		Parkes, John C.	Woolwich
1854	312	*Parkes, John P.	Manchester
1842		Parkes, Joseph	Atherstone
1857	155	Parkinson, Robert	Bradford
1842		Parkinson, Thomas	Liverpool
1841		*Parnell, John	Peterborough
1843		Parr, Samuel	Nottingham
1842		Parsons, Edward	Barnstaple
1850		Parsons, William	Portsmouth
1853		Pasmore, George	Portsmouth
1853		Pate, Henry Thomas	Ely
1853		Paterson, William	Aberdeen
1858	453	*Patterson, Douglas John	Mansfield
1853		Patterson, George	Stamford
1853		Pattinson, Richard John	Carlisle
1853		*Paulden, William	Altrincham
1841		Payne, Reuben Craven	Bridgewater
1854	314	Peake, Henry	Dover
1855	313	Peake, James	Walmer
1842		Pearce, Thomas	Gloucester
1853		Pearman, Henry	Newport, Monmouth
1842		Pearson, Charles James	Swansea
1851		Pearson, Edward	Liverpool
1842		Peart, David	Epsom
1842		Peat, Walter	Fareham
1865	712	Peele, Henry A.	Durham
1853		Pegg, Herbert	Birmingham
1852		Penney, William	Poole
1851		Peppercorn, Benjamin	Lincoln
1855		Perfect, George	Portsea
1841		Perrins, William	Worcester
1843		Perry, Solomon	Tavistock
1853		Pertwee, Alfred R.	Chelmsford
1853		Pertwee, Edward	Romford
1852		Phillips, Edward James	Newport, Monmouth
1853		Phillips, John	Newport, Monmouth
1853		Phillips, John	Birmingham
1856	326	Phillips, William Thomas	Carmarthen
1853		Pickering, Atkinson	Hull

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1842		Pickering, Henry	Leicester
1845		Pickup, Thomas Hartley	Blackburn
1848		Pickup, Varey	Salford
1859	301	*Picnot, Charles	Strood
1853		Pidgeon, John	Liverpool
1841		Pierce, Edward Lloyd	Shelton
1853		Pilley, John	Boston
1853		Pilley, Samuel	Boston
1853		*Piquet, John	Jersey
1853		Pissey, William	Rayleigh
1853		Pitts, Robert Christopher	Norwich
1859	289	Place, William Thomas	Wakefield
1853		Player, Edmund	Bristol
1842		Plomley, James Foulis	Rye
1864	473	Pochard, Ernest F. M.	Mauritius
1842		Pocklington, James	Sydenham
1862	642	*Poll, William Sheppard	Yarmouth
1852		Ponting, Thomas Cadby	Bristol
1845		Pooley, John Carpenter	Bath
1846		Portway, John	Bury St. Edmunds
1853		Potts, Thomas	Newcastle-on-Tyne
1855		Poulton, John	Newton Abbot
1842		Powell, Edward	Winchester
1852		Powell, Frederick W.	Leith
1842		Powell, John	Shaftesbury
1852		Power, Edward	Walton-on-Thames
1862	655	*Pratt, Henry	Shipston-on-Stour
1841		Pratt, John	Chichester
1846		Pratt, John	Bradford
1853		Pratt, Richard Munton	Otley
1852		Prince, Henry	Taunton
1855	290	*Pring, Walter	Taunton
1855		Prior, George T.	Oxford
1842		Prockter, Richard Edgcumbe	Cheltenham
1853		Procter, Joseph	Beverley
1841		*Procter, William	Settle
1857	248	Proctor, Barnard S.	Newcastle-on-Tyne
1848		Proctor, William	Newcastle-on-Tyne
1841		Proctor, William B.	Newcastle-on-Tyne
1859	384	*Prosser, Thomas Evan	Colchester
1852	144	*Prott, William	Huntly
1842		Prout, Robert	Milton Abbot
1853		Pryer, William Symes	Axminster
1852		Pullin, Edward	Northampton
1841		Purdue, Thomas	Witney
1855	355	*Pyne, Joseph J.	Manchester
1852		Quested, George	Margate
1841		Radley, William Valentine	Sheffield
1842		Raimes, Richard	Edinburgh
1854	302	Rainey, Edward	Spilsby
1853		Rait, Robert C.	Partick
1853		Ralfs, Henry Charles	Brentford
1841		Randall, Edward Mayor	Southampton
1853		Randall, Thomas	Wareham

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1845		Randall, William Brodribb	Southampton
1853		Randleson, William	Whitehaven
1853		Ranken, James Anderson	Forfar
1848		Rankin, William	Kilmarnock
1842		Ransford, Samuel	Clevedon
1853		Ransom, William	Hitchin
1853		Ransome, Thomas	Manchester
1851		Rastrick, George T.	Geelong
1842		Rastrick, John Alfred	Woolwich
1842		Rastrick, Joseph Linington	Southsea
1865	797	Rastrick, Robert J.	Southsea
1853		Rastrick, William Henry	Portsea
1853		Rawdin, Joseph	Jedburgh
1841		Rawle, William	Melbourne
1854	206	Rayner, John	Nottingham
1852		Rayner, John	Uxbridge
1859	543	*Rayner, John Charles	Uxbridge
1859	408	Rayner, William	Sheerness
1864		Read, James	Salisbury
1842		Reading, Richard Grant	Warwick
1841		Readman, William	Leighton Buzzard
1842		Redfern, John	Ashby-de-la-Zouch
1853		Redmayne, Christopher	Warrington
1853		Rees, William Henry	Dartmouth
1853		Reid, David	Aberdeen
1853		Reid, John	Montrose
1857	251	Reid, Neil	Perth
1856		Reilly, William Charles	Hampstead
1845		Reinhardt, Johann Christian	Leeds
1848		Rendall, John M.	Torquay
1854	109	Reynolds, Richard	Leeds
1842		Reynolds, William	Halesworth
1849		*Rhodes, Frank	Spalding
1853		Rhodes, James	Manchester
1853		Rich, Thomas	Weston-super-Mare
1853		Richardson, Allen	Manchester
1859	459	*Richardson, John George Frederick	Leicester
1842		Richmond, Robert	Leighton Buzzard
1865	783	Rickards, Edwin	Portsmouth
1842		Rimmington, Felix M.	Bradford
1842		Ritson, John George	Sunderland
1842		Ritson, Thomas	Sunderland
1841		Roberts, Albinus	St. Albans
1858	483	*Roberts, Peter	St. Asaph
1841		Roberts, Thomas	Manchester
1853		Roberts, Thomas A.	Conway
1852		Robertson, James	Edinburgh
1853	331	*Robertson, Thomas B.	
1855	193	Robinson, Benjamin	Pendleton
1842		Robinson, James Mowld	Beverley
1854		Robinson, Levi	Alford
1855	249	Robinson, Ralph	Lynn
1842		Robson, George	Durham

Year of Member-ship.	No. of Certificate.	NAME.	RESIDENCE.
1851		Robson, Thomas	Brighton
1853		Rodgerson, William	Liverpool
1847		Roe, Septimus	Salisbury
1843		Rogers, Henry	Newcastle-on-Tyne
1853	5	Rogers, John Robinson	Honiton
1853		Rogers, William	Maidstone
1842		Rogerson, Michael	Bradford
1863	250	Rolfe, William Adolphus	Bath
1853		Rome, Robert M.	Langholm
1853		Rook, Edward	Sittingbourne
1853		Rooker, Abel	Bromsgrove
1851		Roose, Robert	Flint
1853		Row, Charles	Devonport
1843		Rowe, John	Plymouth
1853		Rowland, Thomas	Epping
1853		Rowlands, William S.	Devizes
1853	84	*Russell, Charles J. L.	Windsor
1853		Rust, James	Thaxted
1865	734	Saer, David P.	Pembroke Dock
1853		Sagar, Henry	Leeds
1858	219	Salisbury, William Bryan	Leicester
1842		Sanders, Henry Wotton	Bristol
1847		Sandiland, Robert B.	Bicester
1853		Sangster, John	Aberdeen
1865	463	Sarsfield, William	Durham
1853		Satterley, William B.	Guernsey
1845		Saunders, David Price	Haverfordwest
1853		Saunders, George J.	Oswestry
1841		Savage, William Dawson	Brighton
1863	616	*Savage, William Wallace	Brighton
1865	790	Saville, John	Howden
1841		Sawer, William	Nayland
1865		Sawyer, Henry	Ramsgate
1841		Sawyer, Thomas	Ramsgate
1842		Sawyer, James	Carlisle
1853		Saxby, Henry	Lewes
1852		Scarrow, William	Sunderland
1846	2	Schacht, Frederick George	Clifton
1853		Scott, Edward	Birmingham
1854	239	Seath, Alexander	Dunfermline
1849		Seaton, George	Chelmsford
1847		Seaton, John Love	Hull
1865	798	Sells, Robert James	Tunbridge Wells
1846		Sewell, James C.	Sheffield
1841		Seyde, John F.	Willenhall
1853		Shadford, Major	Spalding
1853		Sharland, Edmund T.	Bristol
1853		Sharp, Benjamin	Ipswich
1847		Sharp, Henry	Christchurch
1843		Sharples, George	Preston
1853		Shattock, John	Taunton
1842		Shaw, Alexander Henry	Stockport
1848		Shaw, John	Liverpool

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1854		Shenstone, James B.	Colchester
1853		Shepherd, James	Aberdeen
1857	371	Shepherd, George Prentis	Guildford
1865	793	Shepperley, George	Nottingham
1848		Shepperley, James	Nottingham
1852		Shield, George	Arbroath
1853		Shield, Spooner	Liverpool
1842		Shillcock, Joseph Bradley	Bromley, Kent
1853		Sidebottom, William	New Mills
1842		Silvester, Joseph	Knutsford
1853		Sim, James	Aberdeen
1865	639	*Simpson, Arthur L.	Stowmarket
1843		Simpson, John	Hull
1842		Simpson, Thomas	Stowmarket
1865	776	Sims, Joseph	Hirwain
1853		Sinclair, William	Aberdeen
1852		Sircom, Richard	Bristol
1841		Sirett, George	Buckingham
1863	277	Sirett, George B.	Buckingham
1843		Skoulding, William	Wymondham
1865	805	Sloggett, Thomas C.	Plymouth
1853		Smale, Richard Bill	Oswestry
1843		Smallwood, John Wright	Macclesfield
1853		Smart, Nevill	Littlehampton
1859	454	*Smeeton, William	Leeds
1853		Smethurst, Richard L.	Salford
1842		Smith, Alfred	Tenterden
1842		Smith, Henry	Edinburgh
1853		Smith, James S. T. W.	Hexham
1860	603	*Smith, James Taylor	Kilmarnock
1843	31	Smith, John	Southampton
1841		Smith, Nathaniel	Cheltenham
1841		Smith, Thomas	Colchester
1853		*Smith, Thomas	Edinburgh
1856	416	*Smith, Thomas J.	Hull
1842		Smith, William	North Shields
1849		Smith, William	St. Andrews
1842		Smith, William	Sutton Coldfield
1842		*Smith, William	Abingdon
1853		Smith, William	Bridlington
1853	169	Smith, William	Brighton
1853		Smyth, Walter	Merthyr Tydfil
1842		Snape, Edward	Birmingham
1841		Snowdon, George Wrangham	Wimbledon
1841		Southall, William	Birmingham
1850		Southall, William, jun.	Birmingham
1842		Sowerby, John	Carlisle
1843		Spencer, Charles	Gravesend
1853		Spencer, George	Lincoln
1853		Spencer, Thomas	Wokingham
1853		Spencer, William Henry	Burnham Market
1842		Spicer, Thomas	East Moulsey
1853		Spokes, Peter	Reading

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1845		Spong, Thomas Willsden	Biggleswade
1842		Squire, William	Hanwell
1853		Squire, William	Nottingham
1853		Squire, William	Goole
1853		Stafford, William	Gloucester
1842		Standring, Thomas	Manchester
1860	480	*Stanford, Edward C. Cortis	Worthing
1842		Stantial, John	Corsham
1855	148	Steel, David	Edinburgh
1856	291	Steel, Henry	Chatham
1853		Steel, Samuel	Beccles
1853		Stephens, Thomas	Merthyr Tydfil
1858	492	*Stephenson, John B.	Edinburgh
1853		Sterriker, John	Driffield
1852		Stevens, George	Strood
1849		Stevens, John	Broseley
1846		Stevenson, Richard	Derby
1854	278	Steward, Alfred	Yarmouth
1842		Steward, Charles S. Dale	Yarmouth
1853		Steward, John	Brierley Hill
1841		Steward, Josiah	Kidderminster
1841		Steward, Theophilus	Kidderminster
1847		Steward, William	Bridgenorth
1858		Stewardson, Henry	Bedford
1841		Stiell, Gavin	Dunfermline
1858	491	*Stirling, George	Dunoon
1853		Stoddart, William Walter	Bristol
1853		Stone, John	Exeter
1852		Stonham, Thomas G.	Maidstone
1841		Stott, William	Sowerby Bridge
1847		Strawson, Henry	Crewkerne
1862	550	*Street, Edward	Cheltenham
1856	292	Stroud, John	Bristol
1841		Sturton, John	Peterborough
1864	656	*Sturton, John Rowland	Peterborough
1853		Sturton, Joseph	Cambridge
1855	394	*Sturton, Richard	Peterborough
1852		Sumner, John	Birmingham
1852		Sumner, Robert	Liverpool
1856	170	Sumner, William	Birmingham
1853		Sutherland, John	Aberdeen
1853		Sutterby, Jonathan N.	Long Sutton
1860	573	*Sutton, Charles William	Stowmarket
1853		Sutton, Francis	Norwich
1853		Swindells, Frederick M.	Blackpool
1864	606	*Symes, Charles	Birkenhead
1852	149	Tait, William	Edinburgh
1865	794	Taite, James	Glasgow
1845		Talbot, John Hind	Liverpool
1841		Tanner, Nicholas William	Exeter
1853		Taplin, Joseph	Bristol
1847		Tarzewell, Richard	Braintree
1841		Tatham, John Walkingame	Barnstaple

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1852		Tatham, Leonard F.	Bradninch
1845		Tayler, William Henry	Warminster
1842		Taylor, Edward	Rochdale
1842		Taylor, James	Manchester
1841		Taylor, John	Preston
1852		Taylor, John	Wakefield
1848		Taylor, John Usher	Bedford
1854	362	Taylor, Richard	Ryde
1842		Taylor, Stephen	Westbury
1850		Taylor, Sydney	Pendleton
1842		Taylor, Thomas H.	Manchester
1841		Taylor, William James	Middlesborough
1848	7	Teasdale, Thomas B.	Darlington
1842		Teear, John Manshaw	Leicester
1843		Telfer, Frederick	Leytonstone
1853		Templeton, John	Perth
1853		Thomas, James	Bridge, Kent
1853		Thomas, James	Hythe
1853		Thomas, John	Cowbridge
1842		Thomas, John Holliday	Boston
1865	778	Thomas, Rees	Merthyr Tydfil
1846		Thomas, Richard	Burnley
1852		Thomas, Robert	East Looe
1846		Thompson, Andrew	Carlisle
1862	559	*Thompson, Charles Henry	Maidenhead
1846		Thompson, Edward	Otley
1853		Thompson, George	Alston
1842		Thompson, Henry	Middlesborough
1853		Thompson, Henry	Norwich
1849		Thompson, John	Liverpool
1841		Thompson, John	Thirsk
1859	502	Thompson, John Robert	Bishopwearmouth
1864		Thompson, Morley	Lewisham
1850		Thompson, Thomas	Richmond, Yorkshire
1853		Thompson, William	Sunderland
1853		Thonger, Gilbert	Birmingham
1853		Thorne, John	Wellingborough
1853		Thornton, Edward	Lyme Regis
1853		Thornton, John	Wedmore
1857	417	Thornton, John Barber	Dover
1842		Thornton, Samuel	Exmouth
1853		Thurland, Edward	Oxford
1853		Tiernan, Robert	Liverpool
1853		Timothy, Thomas Norris	Reading
1841		Titherington, Thomas A.	Liverpool
1863	522	Tollinton, Richard B.	York
1843		Tomlinson, Charles Knowles	Lincoln
1841		Tonge, Charles	Oldbury
1847		Tonge, James Scawin	York
1853		Toone, Joseph Vidler	Warminster
1853		Townsend, John H.	Bristol
1842		Tozer, Richard John	Exeter
1841		Tribe, John	Chatham

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1841		Trueman, William	Durham
1841		Tryon, William George	Portsea
1857	342	*Tuck, Francis	Oxford
1863	664	*Tuck, John	Wilton
1843		Tucker, Charles	Bridport
1853		Tucker, James	Gloucester
1853		Tuff, John	Enfield
1865	813	Tugwell, William H.	Greenwich
1842		Tunley, John	West Bromwich
1851		Turner, Frederick E.	Holywell
1848		Turner, John A.	Liverpool
1853		Turner, Robert	Oundle
1856	264	Turner, Walter	Mold
1854	265	Turner, William Henry	Oswestry
1853	162	Turney, Samuel B.	Plymouth
1853		Turton, Luke	Bradford
1853		Turton, Thomas J.	Howden
1859	516	*Twinberrow, John	Worcester
1841		Tylee, John P.	Bath
1842		Uppleby, Henry	Leamington
1862	594	*Underdown, Frederick William	Farnham
1865	779	Upjohn, Henry C.	Oxford
1853		Urquhart, James	Aberdeen
1864	688	Utley, Alfred	Liverpool
1853		Veitch, James	Dunse
1853		Veitch, William	Shildon
1845		Vincent, Philip	Fulham
1853		Vose, Thomas	Liverpool
1842		Wain, William	Ripley
1842		Wainwright, James	York
1842		Waite, Joseph	Cheltenham
1842		Walker, Edward Hawxby	Doncaster
1841		Walker, George Clarke	Jersey
1842		Walker, Henry John	Bath
1853		Walker, John	Bradford
1865	795	Walker, Joseph	Bootle, nr. Liverpool
1845		Walker, Robert	Maidenhead
1842		Walker, William	Malmesbury
1864		Walker, William, jun.	Malmesbury
1846		Walker, William Henry	Southport
1842		Walkinton, William	Tenby
1848		Wall, William James	Tottenham
1857	75	Wallworth, David	Maldon
1860	266	Walmsley, Samuel	Kingston-on-Thames
1854	343	Walsh, Edward	Manchester
1861	595	*Walsh, Edward	Oxford
1853		Walter, Joseph	Horncastle
1848		Walton, John	Sunderland
1842		Warburton, Thomas	Chowbent
1841		Ward, James	Falkingham
1851		Ward, William	Sheffield
1853		Wardle, William Henry	Stalybridge
1842		Warrior, William	Northallerton

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1853		Waterall, George	Nottingham
1853		Waterall, George Edwards	Nottingham
1853		Waterfall, William	Gateshead
1842		Watkins, George H.	Walsall
1859	517	*Watson, David	Leicester
1847		Watson, Edward M.	Worle
1846		Watson, Henry	Cambridge
1862	660	*Watson, James	
1853		Watt, James	Haddington
1861	602	Watton, Edward	Worcester
1848		Watts, Henry	Chatham
1853		Wavell, John	Ryde
1853		Wearing, William	Lancaster
1853		Wearing, William Henry	Liskeard
1842		Weaver, Frederick	Wolverhampton
1853		Webster, Edwin P.	Newcastle-on-Tyne
1852		Webster, Samuel M.	Warrington
1845		Weeks, Caleb	Torquay
1853		Welch, Charles	Nottingham
1844		Weller, George	Windsor
1850		Wellington, Frederick G. N.	South Petherton
1842		Wellington, James Martin	Oakham
1853		Wellman, William Richard	Jersey
1862	607	Wells, Edwin	Ludlow
1856		West, William	Henfield
1853		Westmacott, George	Manchester
1854	180	Wharrie, Decimus	Liverpool
1854	156	*Wheeler, Francis	Norwich
1847		Wheeler, John	Chipping Sodbury
1842		Whimpray, John	Lancaster
1853		Whitall, James	Chertsey
1853		White, Frank	Nottingham
1846		White, George	Havant
1864	723	White, James Walls	Glasgow
1850		White, Luke Pearson	Penistone
1842		White, Robert Rowles	Dursley
1842		White, Thomas	Bilston
1853		Whitehead, John	Rochdale
1865	814	Whiteway, William H.	Torquay
1863	676	*Whitfield, John	Scarborough
1847	16	Whitfield, John	Worcester
1842		Whitfield, John Lockley	Worcester
1846		Whitlock, Edwin	Salisbury
1852		Whittaker, Ellis	Salford
1853		Whittaker, William	Runcorn
1853		Whittle, Samuel	Leigh
1852		Whitwell, John	Thirsk
1845		Whitwell, John	Peterborough
1853		Wibmer, Lewis Michael	Tunbridge
1853		Wice, Jonathan Haigh	Wakefield
1849		Wickham, William	Deptford
1842		Wigg, John Goddard	Lynn
1845		Wiggin, John	Ipswich

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE.
1853		Wild, David	Oldham
1853		Wild, Joseph	Hyde
1858		Wilkes, David	Bredon
1850		Wilkes, Doctor Tyers	Upton-on-Severn
1852		Wilkes, Seth Martin	Tewkesbury
1842		Wilkes, William	Bromyard
1850	73	Wilkinson, William	Manchester
1853		Williams, Edwin	Manchester
1857	474	*Williams, Henry Levi	Newport, Monmouth
1854		Williams, Joel D.	Bodmin
1853		Williams, John	Leamington
1861	399	Williams, John Thompson	Swansea
1853		Williams, Philip	Horsham
1853		Williams, Robert	Liverpool
1859	531	*Williams, Thomas Kemble	Welchpool
1844		Williams, Walter	Hereford
1853		Williams, William	Haverfordwest
1844		Williamson, James	Hunslet
1865	809	Williamson, James	North Shields
1855	171	Wills, Thomas D.	Barnstaple
1864	670	*Willsher, Stephen H.	Tenterden
1853		Wilshaw, James	Wordsley
1853		Wilson, Edward	Sheffield
1860	152	Wilson, James	Edinburgh
1853		Wilson, John	Harrogate
1855	303	Wilson, Joseph	Penrith
1842		Wilson, Thomas	Bradford
1854		Wilson, William	York
1841		Wine, John	Bristol
1842		Wing, Thomas N.	Melton Mowbray
1856	254	Wingate, Stephen	Gloucester
1842		Witherington, Thomas	Worcester
1853		Withey, William Henry	Stroud
1853		Wood, Benjamin	Halifax
1842		Wood, Henry	Abersychan
1846		Wood, Henry	Brentford
1853		Wood, John Edward	Harlow
1842		Wood, William Webb	Pontypool
1853		Woodcock, Page D.	Lincoln
1852	360	*Woodcock, Joseph	Leicester
1842		Woods, William	Worcester
1842		Wooldridge, Thomas	Windsor
1844		Woolley, Daniel	Stockport
1858	521	*Woolley, George Stephen	Manchester
1854		Woolrich, Thomas	Stone
1850		Wootton, William	Wolverhampton
1856	255	Wortley, John	Durham
1842		Wreaks, George D.	Sheffield
1842		Wreaks, Thomas Peacock	Glossop
1842		Wright, Charles	Manchester
1846		Wright, George Warren	Macclesfield
1853		Wright, James	Chesterfield
1853		Wright, Joseph	Ardwick

Year of Membership.	No. of Certificate.	NAME.	RESIDENCE
1853		Wright, William	Liverpool
1853		Wyatt, Samuel	Tottenham
1845		Wylde, John	Manchester
1841		Wyley, John	Coventry
1865	821	Yeoman, John	Stockport.
1852	153	*Young, James R.	Edinburgh
1844		Young, John	Sunderland
1865	778	Young, Robert F.	
1853		Young, Tonkin	St. Ives
1853	224	Youngman, Edward	Bury St. Edmunds
1855	345	*Youngman, Robert	Cambridge

ASSOCIATES

ADMITTED BEFORE THE 1st OF JULY, 1842.

NAME.	REGISTERED AT
Baigent, William H.	London
Bannick, Henry Stokes	London
Barber, William Jas.	London
Brown, Henry F.	London
Buss, Thomas	London
Chadwick, Henry	London
Charity, William	Alford
Dallas, John	London
Dunn, Edward	London
Hindsley, Henry	London
Lee, James	London
Morgan, William B.	London
Peat, William Henry	Ryde
Ryder, William Henry	Birmingham
Scholefield, Henry	London
Selleck, Edward	London
Steele, John W.	London
Sylvester, Paul	Birmingham
Townsend, Charles	London
Turner, George	Honiton
Walker, Henry	London
Were, Ellis	London
Wood, John	London

ASSOCIATES OF THE SOCIETY

WHO HAVE PASSED THE MAJOR EXAMINATION, AND ARE REGISTERED AS PHARMACEUTICAL CHEMISTS.

Year of Admission.	No. of Certificate.	NAME.	REGISTERED AT
1862	698	Allcock, Christopher	Nottingham
1857	665	Argles, Robert	Clapham
1859	562	Austin, Henry Felix	London
1862	677	Bailey, John Bassatt	Reading
1846	424	Barker, Matthew Mark	York
1854	551	Barnes, Edwin	Durham
1854	374	Barnsby, Robert David	Tours
1861	810	Barrett, James	Leicester
1860	626	Bartlett, James	Bath
1864	796	Barton, Henry	Newark
1857	597	Bearcroft, Richard James	Cheltenham
1860	589	Bell, William Henry	Whitehaven
1859	644	Benger, Frederick Baden	Harlow
1853	576	Bennett, George	Blandford
1863	823	Bennett, George	Chesterfield
1853	346	Bennett, Robert	Lincoln
1855	496	Berger, Volcy	Clapham
1852	208	Blackburn, Francis	Ramsgate
1857	577	Blackman, Thomas	Woolwich
1862	692	Bond, Purnell	Bristol
1863	706	Borchert, Heinrich Theodor G.	Berlin
1859	699	Bourdas, John	London
1856	715	Brayshay, Thomas	Stockton-on-Tees
1862	700	Broughton, Samuel R.	Wrexham
1861	674	Brown, Francis James	Weston-super-Mare
1861	630	Browne, Henry Robert	Deptford
1864	761	Chambers, James	Belper
1853	376	Chapple, Edwin	Bideford
1853	527	Chater, Edward Mitchell	Watford
1862	749	Chave, Francis William	Uxbridge
1854	380	Christopher, James	Crickhowell
1859	648	Coles, John William	Camberwell
1853	281	Cleave, Charles T.	Chudleigh
1853	547	Cook, William	Grantham
1856	617	Cornish, William	Brighton
1858	743	Davenport, John Metcalf	London
1859	566	Delves, George	Tunbridge Wells
1861	640	Duffin, Thomas	Wakefield
1853	229	Duncanson, William	Glasgow
1856	766	Eminson, John M. O.	Gainsborough
1853	368	Evans, William H.	Haverfordwest
1856	464	Featherstone, John P.	London
1859	649	Ferneley, John William	Grantham

Year of Admission.	No. of Certificate.	NAME.	REGISTERED AT
1853	336	Fisher, William F.	London
1856	554	Fleetwood, Thomas	Stratford-on-Avon
1855	690	Fletcher, John	Camberwell
1860	657	Francis, Robert D.	Bishop's Castle
1858	511	Francis, Thomas Harper	Dulwich
1861	631	Garland, Alfred Philip	Hereford
1853	614	Gething, William B.	Lincoln
1863	782	Gilling, John	Lincoln
1863	754	Gowland, George R.	Sunderland
1858	525	Gray, Frederick	London
1859	720	Greaves, William Samuel	Ironville
1860	591	Grieves, Austin Stirling	Ludlow
1854	529	Griffiths, Alfred William	London
1861	755	Griffith, William H.	Bristol
1856	584	Hall, Thomas Howard	Southampton
1860	684	Hardy, Samuel Croft	Birmingham
1859	756	Hickman, William	Maidstone
1856	574	Hill, William	Edinburgh
1860	600	Hodges, William	Ramsgate
1861	633	Holloway, Thomas Henry	Sydenham
1859	746	Holmes, Edward Morell	Chelsea
1859	615	Hooper, Frank	London
1858	720	Hopgood, Richard Cooper	Chipping Norton
1860	724	Hoskin, Montague John Roberts	Southampton
1859	827	Hudson, John William	Bradford
1858	675	Hughes, Hugh Griffith	Holyhead
1859	811	Isherwood, James	London
1853	472	Johnson, Joseph	London
1848	382	Jones, Hugh Lloyd	Chester
1861	686	Jones, John Edwards	Cardigan
1861	635	Jones, Walter William	Brecon
1856	489	Jones, Peter Cooke	London
1859	593	Jones, Robert William	Greenwich
1849	490	Jones, Thomas	Chester
1855	572	Keene, John	Brighton
1862	679	Kitchin, William Henry	Whitehaven
1859	629	Laurens, Frederic Lemprière	Jersey
1856	587	Lawrence, Henry	Stratford, Essex
1857	478	Lee, John William	Liverpool
1856	300	Linford, John	Canterbury
1853	330	M'Intyre, Peter S.	Warkworth
1864	732	Magor, Martin	Truro
1856	451	Marks, Nelson S.	Cardiff
1852	680	Marrack, Philip	Crediton
1853	247	Matterson, Edward H.	York
1863	758	Mayfield, John Thomas	Wolverhampton
1860	615	Meadows, Henry	Gloucester
1857	512	Mee, George	Woolwich
1859	717	Miller, Thomas Henry	Crediton
1853	216	Morgan, William	Richmond
1863	711	Neve, Francis Charles	London
1860	860	Norrish, Henry	Crediton
1857	482	Oliver, John Hamer	Salop

Year of Admission.	No. of Certificate.	NAME.	REGISTERED AT
1857	581	Orton, Thomas J.	Nuneaton
1852	530	Paine, Standen	Brighton
1853	354	Parrott, John S.	Birmingham
1859	764	Pasmore, Frederic R.	Chelsea
1859	748	Payne, Sidney	Stratford-on-Avon
1860	666	Pearson, Henry Jackson	Louth
1853	413	Penton, Charles W.	Maidstone
1858	582	Pertwee, Frederic	London
1859	751	Phillips, Jonathan	Godalming
1859	565	Powers, Edward	Stourbridge
1860	812	Preston, Joseph C.	London
1863	733	Reece, John	Rotherham
1855	440	Richards, Charles	Weymouth
1858	544	Richardson, Robert	Ipswich
1853	545	Roberts, Albinus J.	Horsham
1860	830	Rose, Alfred	London
1862	668	Sampson, Robert George	London
1860	647	Sanders, Albert John	Sandgate
1864	856	Sargent, George W.	Liskeard
1854	638	Saxby, Henry	Lewes
1853	316	Scott, Thomas	Birmingham
1859	744	Scruby, William Yull	Romford
1861	798	Sells, Robert James	Canterbury
1858	799	Shaw, Benjamin	Wakefield
1860	825	Shephard, Thomas F.	Brighton
1853	188	Sidley, Thomas Insall	Edinburgh
1853	356	Smith, Joseph	Birmingham
1857	475	Smith, William	Glasgow
1853	349	Smith, Richard	Reigate
1855	651	Spearing, James	Southampton
1863	752	Squire, Alfred Rook	London
1853	509	Steevens, Joseph G.	Guildford
1853	687	Stevens, Henry William	Colchester
1861	662	Strawson, George Frederick	Crewkerne
1862	735	Swenden, James	Darlington
1855	409	Taplin, Frederick	Bristol
1857	691	Tayler, George Spratt	Harrogate
1860	575	Taylor, Herbert D.	Manchester
1853	221	Taylor, John Nunwick	Lincoln
1853	320	Thompson, Henry	Leatherhead
1856	498	Tiplady, Frederick	York
1860	705	Trollope, William Thomas	Yarmouth
1855	560	Videon, Charles	London
1862	681	Ward, Joseph	Nuneaton
1860	727	Warren, George Robert	Ware
1860	765	Watts, John	London
1856	596	Waugh, Alexander	Southampton
1860	682	Welborne, George	Grantham
1853	456	West, Robert G.	Liverpool
1856	455	Weston, Charles	Lincoln
1857	503	Wheldon, Henry William	London
1862	714	Wilson, Thomas	Stowmarket
1851	114	Whitfield, Henry	Worcester

Year of Admission.	No. of Certificate.	NAME.	REGISTERED AT
1855	442	Williams, David Martin	Truro
1854	359	Willmott, William	Bristol
1863	696	Wink, John Adam	Edinburgh
1859	643	Young, William	Banbury

ASSOCIATES OF THE SOCIETY

WHO HAVE PASSED THE MINOR EXAMINATION, AND ARE REGISTERED AS ASSISTANTS.

Year of Admission.	No. of Certificate.	NAME.	REGISTERED AT
1853	704	Ambrosse, John D. L.	Putney
1865	895	Amoore, Charles	Hastings
1853	441	Allingham, George Samuel	London
1862	908	Applegate, Sidney	London
1856	424	Arnold, Spencer	Maidstone
1857	710	Baker, Thomas	Blandford
1861	722	Barlow, John	Birmingham
1861	711	Barnitt, John	Leeds
1862	758	Barton, Frederick George	Leicester
1861	888	Bateman, Thos. Henry	Salisbury
1850	393	Baxter, George	Chester
1862	767	Beal, Edmund John	Harlow
1857	691	Bell, William	Bedford
1857	437	Bell, William M.	Stonehouse
1857	712	Bell, James Alfred	Brighton
1862	772	Bisset, George M.	Edinburgh
1861	692	Blane, Gilbert	Mauritius
1859	601	Brett, Robert	Bath
1856	681	Brew, John A.	Brighton
1860	626	Brooks, Frederick	Tunbridge Wells
1862	889	Brough, Henry J.	Windsor
1858	536	Brown, Charles Hills	Devonport
1855	461	Brown, John	London
1862	799	Browne, Thomas Llewelyn	Chester
1860	912	Brownen, Georgo	Christchurch
1858	729	Capern, Alfred	Bedford
1860	670	Capner, William M.	Birmingham
1853	636	Christian, John O.	Douglas
1865	902	Chubb, Osborn	Taunton
1860	660	Churchyard, Robert L.	Bungay
1859	582	Clapham, Edward	Leeds
1860	890	Clayton, Francis C.	Leeds
1860	655	Cleave, Samuel W.	Bodmin

Year of Admission.	No. of Certificate.	NAME.	REGISTERED AT
1854	344	Clingan, William M.	Edinburgh
1853	543	Cocking, Thomas	Maldon
1848	226	Coles, Ferdinand	London
1859	762	Conder, George	Walworth
1865	879	Cornelius, Richard B.	Clapham
1865	882	Cox, Samuel G.	Leicester
1865	880	Cruse, Thomas H.	Warminster
1864	867	Daggers, Frederick	Preston
1861	724	Dale, George William	Chichester
1856	531	Dallas, Clement	Woodbridge
1857	443	Dakin, John	Chester
1862	756	Davis, Frank Pratt	Newbury
1855	487	Davis, Richard	Walworth
1859	800	Dawson, Oliver Robert	Southampton
1862	912	Brownen, George	Christchurch
1853	761	Earland, William	Hay
1864	913	Ellinor, George	Rotherham
1859	914	Ellis, Henry B.	Bristol
1859	627	Evans, John James	London
1856	418	Farr, Archer	Lambeth
1865	915	Fisher, John Albert	Liverpool
1861	849	Fitt, Francis E.	Barking
1856	698	Fox, Edward M.	Falmouth
1858	773	Fuller, Thomas Gilbert	Burntisland
1864	850	Garside, Thomas	Southport
1853	511	Gill, Levi John	Bridport
1862	845	Goulden, Edward Baker	London
1856	512	Green, James	Bath
1856	455	Grimwood, William	Ipswich
1860	809	Haddock, George John	Norwich
1857	569	Haines, John Jenkins	Bromsgrove
1855	404	Harden, Charles	Bristol
1860	896	Harper, George	Cambridge
1860	891	Harris, Henry W.	Reading
1857	493	Hawkes, James	Birmingham
1864	883	Heald, Benjamin	Sleaford
1862	754	Heathorn, Alfred	Reading
1857	658	Hill, Francis	Leeds
1865	868	Hill, Henry	Kendal
1865	897	Hitchcock, Alfred W.	Oxford
1860	648	Hodgkinson, Charles	Leicester
1857	597	Holmes, William C.	London
1853	353	Holroyde, William H.	Bradford
1861	815	Hooper, Leonard	London
1864	841	Hunt, Charles	Bristol
1847	56	Huskisson, William J.	London
1858	532	Ingall, Joseph	Wath-upon-Dearne
1860	629	Ismay, John George V.	Bristol
1856	666	Jackson, Warwick	Colchester
1852	184	Jamie, Robert	Edinburgh
1854	479	Jefferson, Thomas	Cambridge
1860	903	Jelley, Stephen J.	Hull
1855	380	Jolley, Horace	London

Year of Admission.	No. of Certificate.	NAME.	REGISTERED AT
1853	338	Keeling, Thomas G.	Howden
1861	842	Kinch, Charles James	Henley-on-Thames
1859	589	King, James	Bristol
1865	904	Kirkman, Chas. J.	London
1860	869	Lacey, Richard	Norwich
1853	544	Laming, Welberry	Market Rasen
1861	821	Lasham, John William	Stratford-on-Avon
1854	345	Leighton, Thomas	Edinburgh
1859	708	Lescher, Frank H.	London
1855	399	Lloyd, David L.	Carnarvon
1861	701	Long, Frank	Brighton
1859	795	Lucas, John Philip	Guildford
1848	265	Luff, Henry Thomas	Poplar
1864	870	Mansell, Thomas	East Retford
1860	638	Marriott, Frederick T.	Rugby
1860	618	Marten, Henry Oake	Newfoundland
1856	734	Martin, James	Southampton
1860	853	Martindale, William	Carlisle
1862	881	Matthews, John H.	Reading
1847	148	Matthews, William	London
1858	533	Medwin, Aaron George	Greenwich
1859	631	Merrick, Charles James	Manchester
1858	545	Moore, Francis Samuel	Bristol
1858	506	Muskett, Edwin Burrell	Holt
1855	391	Nooten, Ernest Van	Edinburgh
1861	855	Oldfield, Francis	Dover
1860	643	Oliver, John Gerry	Holsworthy
1859	579	Paris, Thomas	Salisbury
1858	623	Partridge, William	Dudley
1858	824	Parry, William	Crickhowell
1865	886	Payne, Martin H.	Bridgwater
1856	452	Pearson, Edward Smith	Liverpool
1855	611	Potts, Robert Alfred	London
1862	792	Preston, Joseph Classon	London
1864	843	Pugh, George	Cheltenham
1858	892	Rayner, Gilmour G.	Swansea
1856	524	Rees, Thomas George	Pembroke Dock
1856	613	Reynolds, Freshfield	Guildford
1859	703	Richardson, Robert	Dumfries
1860	893	Richardson, Joseph H.	Plymouth
1859	659	Ridding, William	London
1860	838	Rider, Frederick	London
1857	430	Robinson, John	Woolwich
1853	514	Robinson, William P.	Liverpool
1855	388	Routledge, Henry	London
1863	810	Rowe, Robert	Yeovil
1857	481	Scott, Joseph Robinson	Sheffield
1862	905	Selfe, William G.	London
1861	508	Seymour, George	Oldbury
1863	797	Sharp, David Blakey	York
1853	321	Simpson, Thomas	Walsall
1860	644	Sims, Francis M. B.	Colchester
1858	509	Slack, John Lawrence	Ormskirk

Year of Admission.	No. of Certificate.	NAME.	REGISTERED AT
1856	735	Slator, Thomas	Boston
1853	268	Speechly, George	Peterborough
1862	906	Starkey, Ebenezer B.	London
1856	423	Stewart, James	Kirkcaldy
1853	281	Stoneham, Philip	London
1855	383	Taplin, George	Bath
1861	894	Thomas, John A.	Boston
1854	346	Thomson, John	Edinburgh
1862	898	Thorn, John James	Crediton
1862	901	Thurston, Frederick	Ipswich
1857	473	Tieftrunk, Julius	London
1858	744	Tilden, Wm. Augustus	London
1853	333	Todd, Thomas	Edinburgh
1858	736	Tolbort, Thomas W. H.	Dorchester
1864	919	Tunley, John	West Bromwich
1859	828	Warland, Francis William	Poole
1860	625	Watson, Frederick	Fakenham
1857	696	Watts, John Newton	London
1859	857	Wearing, Richard H.	Liverpool
1858	553	Weller, James William	Bloxwich
1858	529	Weston, Samuel John	Leicester
1865	887	Whysall, William	Belper
1857	500	Wigg, Henry John	Lynn
1861	719	Wilson, Walter Wm.	Birmingham
1860	771	Wilson, William	Slough
1858	566	Wilkinson, George	Manchester
1864	899	Wilkinson, Joshua H.	Blackheath
1856	432	Williams, Thomas	Carmarthen
1860	715	Wills, Douglas	Lewisham
1858	541	Wilson, Charles Wallace	London
1861	709	Winterbottom, James	Oldham
1858	798	Wootton, Alfred Charles	Luton
1862	782	Wyman, John Sanderson	Alcester

REGISTERED APPRENTICES OF THE SOCIETY.

Date of Registration.	NAME.	RESIDING WITH	TOWN.
1864	Adams, Frank	Mr. Adams	Stoke-on-Trent
1857	Alderson, Frederick H.	Mr. Hempsted	St. Leonards
1859	Allanson, George	Mr. Allanson	Harrogate
1860	Allen, E. Ransome	Messrs. Chapman, Bros.	Ipswich
1860	Allen, Samuel Stafford	Mr. Beale	Hemel Hempstead
1857	Allison, Richard R.	Mr. Howorth	Doncaster
1864	Allkins, Thomas B.	Mr. Ruffe	Tamworth
1858	Allott, Frederick	Mr. Greaves	Bakewell
1864	Anderson, John Brown	Mr. Rogerson	Bradford
1855	Andrews, Enos	Mr. Cropper	Long Sutton
1863	Andrews, George H.	Mr. Smith	Walworth
1860	Aplin, Benj. D'Oyley	Mr. Hill	Norwood
1856	Atkinson, Edward F.	Mr. Kirton	Hull
1853	Atkinson, George John	Mr. Wilson	Harrogate
1858	Atkinson, John P.	Messrs. Hurst & Morton	Louth
1858	Atwood, John Charles	Mr. Cracknell	London
1862	Autton, John Rydon	Mr. Hall	London
1858	Backhouse, Noah	Mr. Rowntree	London
1858	Badcock, Henry	Mr. Peat	Lymington
1857	Bagshaw, James	Mr. Handley	Wakefield
1859	Bamber, John K.	Messrs. Savory & Moore	London
1862	Barber, Harry	Ward and Co.	Richmond, Yorks.
1853	Barber, Tom	Mr. King	Rochester
1854	Barber, William	Mr. Nunn	Bury St. Edmund
1864	Bardsley, William	Mr. Nicholson	Highbury
1857	Barlow, John Podmore	Mr. Barlow	Manchester
1861	Barnett, Elijah Wm.	Mr. Wood	Worcester
1860	Barnett, Thos. James	Mr. Golding	London
1863	Barry, Henry	Messrs. Ritson & Sons	Sunderland
1851	Bartlett, Ebenezer	Mr. Mather	Reading
1856	Barton, Frederick	Mr. Wilson	Bradford
1863	Basker, John Perkin	Mr. Heald	Sleaford
1862	Bass, Charles William	Mr. Lovett	Gloucester
1854	Batchelor, George H. W.	Mr. Watts	Chatham
1856	Bate, Henry	Mr. Davies	Chester
1860	Battman, Thomas	Mr. Wright	Manchester
1855	Beach, Tom Clarke	Messrs. Lea & Co.	Great Malvern
1854	Beach, Wesley	Mr. Beach	Bridport
1860	Beale, Chas. George	Mr. Atkins	Salisbury
1860	Beale, Fred. Wilson	Mr. Atkins	Salisbury
1855	Beaton, Walter	Mr. Beaton	London
1861	Beattie, James	Mr. Gordelier	Sittingbourne
1860	Beattie, John	Mr. Mackay	Edinburgh
1859	Beavan, Alfred James	Mr. Matthews	London
1853	Beddard, John	Mr. Cross	Shrewsbury
1859	Bedford, Joseph	Mr. Bolton	Dover
1862	Beilby, Michael	Messrs. Goode & Son	Congleton
1861	Bell, Rich. Edward	Mr. Noakes	Brighton

Date of Registration.	NAME.	RESIDING WITH	TOWN.
1864	Bemrose, Joseph	Mr. Young	Liverpool
1855	Bennington, William	Mr. Mortimer	Sidmouth
1859	Benson, James Levett	Mr. Dalwood	Sherborne
1855	Bentley, William J.	Mr. Pryer	Axminster
1859	Berrell, Charles	Mr. Farmer	London
1854	Bingley, Frederick B.	Mr. Tanner	Exeter
1863	Bingley, Richard	Mr. Tanner	Exeter
1861	Bird, Chas. John	Mr. Bird	Worcester
1854	Bird, David L.	Mr. Wilson	Canterbury
1854	Bishop, William	Mr. Gay	Stroud
1862	Bishop, Wm. M.	Mr. Bird	Worcester
1859	Blackbourne, Henry J.	Mr. Jeffery	Horncastle
1858	Bland, Percy Owen	Mr. Fox	London
1858	Blundell, Joseph A.	Mr. Groves	Weymouth
1859	Bolton, Edgar Benj.	Mr. Fairbank	Woolwich
1861	Bolton, Frederick Wm.	Mr. Claremont	London
1860	Bonnett, Frederick	Mr. Price	Bridgend
1860	Bowen, John Thomas	Mr. Parker	Bath
1856	Bowler, Harvey F.	Mr. Hitchcock	Colchester
1860	Boyd, John	Mr. Cornish	Brighton
1854	Bradley, Edwin S.	Mr. Parker	Derby
1858	Bradley, John Perry	Mr. Parker	Birmingham
1857	Brereton, Matthew B.	Mr. Mabson	Yarmouth
1858	Bridges, Charles Wm.	Mr. Biscoe	London
1850	Bridges, George	Mr. Burgess	Dover
1862	Brinsmead, Thomas J.	Mr. Fowler	Torrington
1856	Brock, George Walter	Mr. Fairbank	Woolwich
1856	Brooks, Samuel Brewer	Mr. Lawton	Wakefield
1864	Brooks, Thomas	Mr. Swift	Spalding
1857	Brown, Edward	Mr. Dutton	Birkenhead
1860	Brown, James	Messrs. Gardner and Ainslie	Edinburgh
1865	Brown, Samuel	Mr. Pipes	Beverley
1860	Browne, James	Mr. West	Coventry
1862	Bucklee, Marmaduke W.	Mr. Bucklee	London
1861	Bulgin, William	Mr. Groves	Blandford
1860	Bullock, Frederick	Mr. Parkes	Manchester
1863	Burbidge, Edwin	Mr. Maitland	London
1853	Burdock, James	Mr. Reading	Warwick
1860	Burlingham, Frederick	Mr. Johnson	Birmingham
1856	Burton, John	Mr. Parker	Derby
1854	Burton, Joseph	Mr. Wick	Sheffield
1865	Butcher, Henry	Mr. Botham	Sheffield
1858	Butler, Edward D. B.	Mr. Penney	Poole
1859	Butler, Edwin	Mr. Dowman	Southampton
1857	Campbell, Rubert	Mr. Mackay	Galashiels
1864	Candy, William G.	Mr. Commans	Bath
1859	Canning, Charles W.	Mr. Keene	Leamington
1861	Cantrell, William S.	Mr. Tylee	Bath
1860	Carr, John	Mr. Scarrow	Sunderland
1861	Carré, Joseph	Mr. Tylee	Bath
1857	Carré, Louis C. A.	Mr. Tylee	Bath
1855	Carrington, Ebenezer T.	Mr. Toone	Warminster
1859	Carter, Thomas	Mr. Dresser	York

Date of Registration.	NAME.	RESIDING WITH	TOWN.
1855	Cartner, David	Mr. Bell	Carlisle
1863	Cave, Alfred	Messrs. T. & E. Anderson	London
1854	Chambers, William	Mr. Dresser	York
1855	Chapman, Francis C.	Mr. Green	Droitwich
1865	Cheesman, John	Mr. Pearman	Newport.
1862	Cherrington, Arthur O.	Mr. Thomas	Boston
1865	Cleaver, Edward O.	Mr. Geldard	Plymouth
1862	Clampitt, Richard V.	Mr. Tanner	Exeter
1855	Clarke, Willoughby	Mr. Brown	Oxford
1858	Clarkson, Sidney	Mr. Macarthy	Romford
1857	Cole, Alfred	Mr. Groves	Hammersmith
1864	Cole, George	Messrs. Ereaut & Son	Jersey
1862	Collier, Thomas	Mr. Collier	Sheffield
1858	Collier, William	Mr. Collier	Sheffield
1861	Cooke, Francis	Mr. Kershaw	Southport
1860	Cooper, Arthur Cecil	Mr. Blandford	London
1855	Cooper, Frederick	Mr. Cooper	Leicester
1865	Cooper, Herbert H.	Mr. Banks	Birmingham
1859	Cooper, Henry	Mr. White	Nottingham
1861	Copland, Herbert	Mr. Anthony	Bedford
1864	Corner, Robert	Mr. Corner	West Hartlepool
1853	Cornish, Thomas Robert	Mr. Cornish	Penzance
1854	Coulson, Henry	Mr. Coulson	Scarborough
1855	Coulthard, Christopher	Mr. Harrison	Carlisle
1862	Court, Alfred	Mr. Reading	Warwick
1858	Coward, John Senior	Mr. Butler	Pontefract
1854	Cozens, William	Mr. May	Reading
1854	Crease, James R.	Mr. Mackay	Edinburgh
1865	Cross, William G.	Mr. Cross	Shrewsbury
1853	Crussell, James W.	Mr. Cooper	London
1858	Curtis, Albert Augustus	Mr. Churchouse	Chard
1860	Dale, George	Mr. Hughes	Altrincham
1860	Dalrymple, David H.	Mr. Chapman	Bristol
1854	Dalrymple, William	Mr. Luff	Oxford
1863	Davies, David	Mr. Williams	Cardigan
1863	Davies, Daniel R.	Mr. Phillips	Carmarthen
1865	Davies, James	Mr. Wade	Oldham
1861	Davies, Francis P.	Messrs. Southall	Birmingham
1857	Davies, Robert John	Mr. Roberts	London
1858	Davies, William	Mr. Coleman	Cardiff
1856	Davison, William	Mr. Greaves	Bakewell
1858	Dawson, James Henry	Mr. Telfer	Oxford
1855	Dawson, John	Mr. Goddard	Yarmouth
1855	Dean, Samuel	Mr. Fox	London
1858	Denne, Henry	Mr. Kingdon	London
1861	Diaper, Albert	Mr. Banfield	Bury St. Edmund
1858	Dodshon, Edward	Mr. Dodshon	Sunderland
1862	Doney, Francis Goss	Mr. Wagstaff	London
1857	Doughty, Edward T.	Mr. Doughty	London
1860	Douglas, Archibald H.	Messrs. Argles & Co.	Maidstone
1856	Draper, Henry Foulger	Mr. Arnold	Norwich
1858	Dumolo, John Thomas	Mr. Parker	Birmingham
1859	Earnshaw, Benj. King	Messrs. Garratt	Rugby

Date of Regis-ration.	NAME.	RESIDING WITH	TOWN.
1856	Eason, John	Mr. Gilkes	Leominster
1858	Eastman, Jabez	Mr. Clark	Hackney
1861	Edwards, Charles R.	Mr. Gunn	Harrow
1857	Edwards, Frederick H.	Mr. Medcalf	Lower Tooting
1854	Eland, Edward F.	Mr. Telfer	Oxford
1853	Elliot, Robert John	Mr. Steward	Yarmouth
1863	Ellis, Henry	Mr. Roberts	London
1862	Emerson, John	Mr. Emerson	Hartlepool
1864	Emsley, Joseph	Mr. Pratt	Bradford
1860	Epps, Franklin	Mr. Epps	London
1857	Evans, Alfred Paget	Mr. Cutting	Leamington
1853	Evans, Edward	Mr. Bancroft	Ruthin
1857	Eve, Charles	Mr. Wilson	Holloway
1864	Ewens, Frederick Thomas	Mr. Morris	Cheltenham
1854	Fairley, Robert	Mr. Mackay	Edinburgh
1860	Fancourt, John	Mr. Lavers	Blackheath
1865	Farries, Thomas	Mr. Forge	Driffield
1864	Farthing, Thomas	Mr. Morton	Durham
1856	Farrar, William	Mr. Heming	Sunderland
1862	Fenn, Charles Draper	Messrs. Ferris and Co.	Bristol
1863	Finlay, James L.	Mr. Aitken	Edinburgh
1861	Finch, Thomas	Mr. Aitkin	Edinburgh
1845	Flood, William	Mr. Goodman	Exeter
1857	Foggitt, Thomas	Mr. Smeeton	Leeds
1862	Forbes, William T.	Mr. Forbes	Reigate
1853	Forth, William W.	Mr. Headley	Bridlington
1861	Fosbrooke, Fred. J. R.	Mr. Hickley	London
1854	Foster, Thomas U.	Mr. Weston	Sleaford
1863	Fox, William R.	Mr. Fox	London
1862	Franklin, Alfred	Mr. Hunt	Winchester
1853	Fresson, William	Mr. Fresson	Stevenage
1865	Fripp, Percival K.	Mr. Constance	London
1857	Gibbs, Thomas	Mr. Steward	Yarmouth
1851	Gilliat, William	Mr. Gamble	Grantham
1864	Gillies, John Whitfield	Messrs. Ritson & Sons	Sunderland
1859	Gillies, Wm. Jonathan	Mr. Dunn	St. Austell
1855	Goodchild, Nathaniel	Mr. Wood	Brighton
1859	Goodwin, Medmer	Mr. Telfer	Oxford
1863	Gorton, Charles	Mr. Gorton	London
1860	Gray, Thomas	Mr. Banks	Birmingham
1861	Gray, William	Mr. Banks	Birmingham
1861	Greatrex, Thomas Jas.	Mr. Andrews	London
1860	Green, Edwin G.	Mr. Greaves	Bakewell
1862	Green, Isaac	Mr. Phillips	Coventry
1855	Gregory, Richard	Mr. Lavers	London
1858	Greig, Francis	Mr. Mackay	Edinburgh
1855	Grigor, William	Mr. Macfarlan	Edinburgh
1859	Hadley, Thomas	Mr. Harris	Hereford
1863	Hall, Alfred Richard	Mr. Lawrence	Kensington
1856	Halsey, Bennet	Mr. Husband	Exeter
1854	Ham, Charles	Mr. Foster	Collumpton
1860	Hamilton, Herbert B.	Mr. Savage	Brighton
1862	Hankin, Frederick	Mr. Horncastle	London

Date of Registration.	NAME.	RESIDING WITH	TOWN.
1860	Harland, Richard Thos.	Mr. Dresser	York
1854	Harley, Edward	Mr. Foster	Ludlow
1858	Harper, Wm. James	Mr. Gent	Macclesfield
1861	Harrison, George	Mr. Harrison	Sheffield
1856	Harrison, Stephen	Mr. Breary	Douglas
1865	Hart, James	Mr. Williams	Manchester
1856	Hatch, Richard M.	Mr. James	Bognor
1857	Hatchard, Stephen	Mr. Huggins	Alresford
1859	Hatchett, Thomas	Mr. Hemingway	London
1856	Head, John T.	Mr. Head	Lewes
1857	Heald, Alfred John	Mr. Barley	Wisbeach
1864	Heald, John Aulsebrook	Mr. Sinimberghi	Rome
1865	Hearne, Frederick	Mr. Stevens	Strood
1857	Highway, Matthew H.	Mr. Caddick	Newcastle-u.-Lyne
1843	Hill, William	Mr. Rowe	Plymouth
1857	Hoare, James Raper	Mr. Gigner	Chelsea
1852	Hodgkinson, John S.	Mr. Brooker	Macclesfield
1861	Holden, Abraham Hobson	Mr. Handley	Wakefield
1856	Holland, William	Mr. Sibary	Longton
1864	Hollier, Edward R.	Mr. Hollier	Dudley
1863	Holmes, Walter Murton	Mr. Mohun	Ramsgate
1855	Holmwood, William C.	Mr. Coppock	Bridport
1855	Holt, George F. W.	Mr. Obbinson	Sleaford
1863	Hopper, Charles B.	Mr. Brearey	Douglas
1854	Horn, William	Mr. Longrigg	Appleby
1862	Howes, Thomas M.	Messrs. Greville & Taylor	Northampton
1864	Howlett, Henry J.	Mr. Rastrick	Southsea
1859	Hughes, Thomas Jones	Mr. Hughes	Holyhead
1862	Hutchinson, Marshall H.	Messrs. Macfarlan	Edinburgh
1858	Ive, William	Mr. Lawrence	Kensington
1863	Jackson, Charles Fred.	Mr. Collings	Bristol
1856	Jackson, John	Messrs. Wilson & Co.	Bradford
1861	Jackson, John E.	Messrs. Argles & Co.	Maidstone
1855	Jakins, George S.	Mr. Golding	London
1864	Jeffery, George J. C.	Mr. Gulliver	Lutterworth
1861	Jeffery, Henry	Mr. Sharland	Bristol
1862	Johnson, Eli	Mr. Harrison	Nottingham
1862	Jones, Frederick Wm.	Mr. Jones	London
1860	Jones, Hugh H.	Mr. Bancroft	Ruthin
1859	Jones, Jas. Davenport	Mr. Marston	Ludlow
1859	Jones, John Reed	Messrs. Garratt	Rugby
1861	Jones, Richard Edward	Mr. Jones	Carmarthen
1865	Jones, Elias Richard	Mr. Brearey	Douglas
1861	Jordan, Edmund H.	Mr. Chubb	London
1865	Joseph, Arthur	Mr. Joseph	St. Leonards
1860	Judson, Charles W.	Mr. Judson	Ripon
1861	Keen, John	Mr. Stocken	London
1856	Kemp, Francis	Mr. Smeeton	Leeds
1862	Kent, Thomas R.	Mr. Kent	London
1863	Kinch, Edward	Mr. Kinch	Henley-on-Thames
1860	King, James Hurman	Mr. Stroud	Bristol
1864	Kingerley, William S.	Messrs. Shadford & Co.	Spalding
1861	Kite, John C.	Mr. King	Rochester

Date of Registration.	NAME.	RESIDING WITH	TOWN.
1861	Knight, Benjamin	Mr. Maggs	Yeovil
1858	Knowles, John Hiles	Mr. Anthony	Bedford
1857	Lacey, Walter	Mr. Meredith	Bristol
1863	Lake, John Hinton	Mr. Tighe	Exeter
1855	Lamplough, John	Mr. Stevenson	Derby
1863	Lane, Eli B.	Mr. Judd	Christchurch
1857	Langley, William	Mr. Tylee	Bath
1857	Lavers, Thomas F.	Mr. Lavers	Lewisham
1853	Lawrence, George	Mr. Wright	London
1858	Leppard, James	Mr. Williams	Horsham
1860	Lightfoot, John	Mr. Shepheard	Chester
1865	Limb, Thomas	Mr. Patterson	Stamford
1860	Lindley, Wm. Walker	Mr. Evans	Swansea
1865	Lindsay, Robert	Mr. Macdonald	Lasswade
1860	Livermore, George	Mr. Goodger	London
1862	Llewelyn, John	Mr. Lister	Cowbridge
1859	Llewellyn, Peter	Mr. Phillips	Carmarthen
1859	Lock, Edward	Mr. Haydon	Fordingbridge
1857	Lovatt, John Hammond	Mr. Wilshaw	Wordsley
1861	Ludgater, Alfred	Mr. Gordelier	Sittingbourne
1862	Luff, William	Mr. Luff	Oxford
1864	Lynn, Samuel	Mr. Wellington	Oakham
1855	McCabe, Dunbar	Mr. Macfarlan	Edinburgh
1858	McGeorge, William	Mr. Carruthers	Dumfries
1857	Machon, Edward	Mr. Parkes	Manchester
1861	Mackmurdo, Edwd. L.	Mr. Mackmurdo	Edmonton
1860	Maine, Phillip B.	Mr. Wills	Barnstaple
1855	Malin, Edmund C. M.	Mr. Huggins	Barnet
1859	Manby, Thomas	Mr. Chenery	Ipswich
1847	Marrack, George	Mr. Searle	Crediton
1857	Martin, Benjamin	Mr. Handley	Wakefield
1859	Martin, Frederic	Mr. Chandler	Margate
1857	Mason, John	Mr. Mason	Hastings
1857	Mathias, Thomas	Mr. Jones	Narberth
1853	Matthews, Charles	Mr. Gostling	Diss
1860	Matthews, Frederick W.	Mr. Baker	Islington
1864	Matthews, Henry	Mr. Biggs	Hampstead
1858	Maudson, Joseph W.	Mr. Maunder	Sheffield
1855	May, Augustus S.	Mr. Greenwell	London
1865	Mepsted, Edward J.	Mr. Chigwell	Wingham
1859	Metcalfe, Chas. J.	Mr. Maitland	London
1864	Metcalfe, Wilson	Mr. Davis	Harrogate
1858	Midgley, Charles	Mr. Rimmington	Bradford, York
1858	Midgley, J. E.	Messrs. Lynch & Wilkinson	Manchester
1857	Midgley, John James	Mr. Reinhardt	Hull
1856	Miller, Duncan S.	Mr. Pooley	Bath
1863	Moir, Alexander	Messrs. Macfarlan	Edinburgh
1858	Monkhouse, Joshua	Mr. Davies	Gainsborough
1857	Moore, Abraham	Mr. White	Birmingham
1862	Moore, Geo. James	Mr. Stroud	Bristol
1856	Morley, Edward	Mr. Asling	Spalding
1856	Morley, George	Mr. Wheeler	Hackney
1860	Morris, William	Mr. Hardman	Kirkham

Date of Registration.	NAME.	RESIDING WITH	TOWN.
1864	Moss, John	Mr. Hulme	Oldham
1865	Mountain, Robert	Mr. Pullan	Harrogate
1859	Moysey, William	Mr. Moon	Ilfracombe
1857	Murrell, John Friday	Mr. Maynard	Brandon
1862	Nelson, William	Mr. Atherton	Nottingham
1856	Newby, John	Mr. Hughes	Altrincham
1861	Newcombe, Henry A.	Mr. Baker	Lewisham
1862	Nix, John Beard	Mr. Nix	Billericay
1864	Noakes, Edward T.	Mr. Noakes	Brighton
1862	Oakes, George	Mr. Paulden	Altrincham
1864	Ockley, Frederick	Mr. Hallaway	Carlisle
1859	Oliver, Robert Dawson	Mr. Smith	Southampton
1856	Overton, William	Mr. Fowke	Stafford
1852	Owles, James John	Mr. Owles	Yarmouth
1862	Padwick, John	Mr. Sharp	Christchurch
1864	Palmer, Alfred Neobard	Mr. Coleman	Bury St. Edmunds
1864	Palmer, Robert Frederick	Mr. Salisbury	Leicester
1863	Palmer, William Francis	Mr. Woodward	Nottingham
1862	Park, John	Mr. Pratt	Bradford, Yorks.
1863	Parker, Henry Walter	Mr. Binge	London
1860	Parkes, Robert	Mr. Townsend	Burton-upon-Trent
1863	Parrott, Edward John	Mr. Towle	Ardwick
1858	Pearcey, Herbert A.	Mr. Biggs	London
1859	Philpot, Arthur Walter	Mr. Wimble	Maidstone
1864	Pickering, Samuel W.	Mr. Higgins	Chester
1858	Pickup, Robt. Lansdale	Mr. Pickup	Manchester
1859	Picton, John T.	Messrs. Picton & Hatton	Warrington
1858	Pissey, William F.	Mr. Pissey	Rayleigh
1857	Pistrucci, Filippo	Mr. King	London
1855	Pitman, John	Mr. Fendick	Bristol
1862	Poore, James E.	Mr. Brew	Brighton
1859	Postans, Arthur Wm.	Mr. Banfield	Bury St. Edmunds
1854	Power, Thomas M.	Mr. Williams	Nottingham
1859	Pratt, Albert Edward	Mr. Smith	Bury St. Edmunds
1860	Pratt, Joseph	Mr. Loggin	Stratford-on-Avon
1865	Preston, Alfred	Mr. Smith	Abingdon
1857	Price, Thomas	Mr. Laen	Pembroke Dock
1861	Priestley, Henry	Mr. Priestley	Sheffield
1864	Prime, Thomas Robert	Mr. Cupiss	Diss
1863	Prockter, Alfred E.	Mr. Wellington	Oakham
1860	Provost, John Arthur	Mr. Chaston	Lowestoft
1857	Prust, Richard	Mr. Brend	Swansea
1858	Pryce, Alfred C.	Messrs. Picton & Hatton	Warrington
1858	Pullen, William H.	Mr. Parkes	Atherstone
1864	Quibell, Thos. O.	Messrs. Mountain & Taylor	Wakefield
1855	Rae, John Inglis	Mr. Mackay	Edinburgh
1858	Rainnie, Alexander	Mr. Stewart	Edinburgh
1865	Raworth, Harrison W.	Mr. Sharland	Bristol
1863	Ray, William Herbert	Mr. Holman	Barnet
1856	Rea, James Parker	Mr. Rea	London
1863	Redford, Edward A.	Mr. Nicol	Edinburgh
1857	Reed, Alfred	Mr. Gordelier	Sittingbourne
1863	Rees, Joseph	Mr. Williams	Cardigan

Date of Registration.	NAME.	RESIDING WITH	TOWN.
1862	Rhodes, Francis	Mr. Ogden	Manchester
1864	Richardson, John H.	Mr. Rastrick	Southsea
1858	Ritchie, John Moffat	Mr. Medley	Derby
1852	Rivers, Henry	Mr. Hornsby	Odiham
1856	Roberts, John L.	Mr. Sibary	Longton
1859	Roberts, Charles	Mr. Handley	Wakefield
1860	Roberts, Thomas E.	Mr. Jones	Rhyl
1859	Robertson, A. G.	Messrs. Macfarlan & Co.	Edinburgh
1857	Robinson, James F.	Messrs. Picton & Hatton	Warrington
1859	Rochford, Percy	Mr. Burden	London
1862	Rogerson, Herbert G.	Mr. Rogerson	Bradford, Yorks.
1864	Rogerson, William J.	Mr. Rogerson	Bradford, ,,
1858	Romans, Thomas	Mr. Cutting	Selby
1864	Ross, Lewis B.	Mr. Ombler	Driffield
1856	Rosselloty, John C.	Mr. Couch	Islington
1853	Salmon, Henry L.	Mr. Moore	Brighton
1862	Samuel, James Burck.	Mr. Herington	Leighton Buzzard
1863	Sartin, Samuel Robert	Mr. Anderson	London
1860	Saul, William Benjamin	Mr. Pring	Taunton
1860	Saul, William W.	Mr. Prior	Oxford
1863	Sawdon, Frederick John	Mr. Coulson	Scarborough
1860	Saxby, Robert	Mr. Saxby	Lewes
1857	Scott, James Furness	Mr. Smith	Dunstable
1857	Seaton, Charles A.	Mr. Hill	Sherborne
1864	Selkirk, James	Mr. Mackay	Edinburgh
1861	Severs, Joseph	Messrs. Harvey & Reynolds	Leeds
1859	Shadford, Thomas	Mr. Shadford	Spalding
1864	Sharpe, Leonard George	Mr. Sharpe	Notting Hill
1863	Shaw, Henry Woolhouse	Mr. Wellington	Oakham
1855	Shaw, Ward	Mr. Lofthouse	Hull
1854	Shepley, Samuel	Mr. Claughton	Chesterfield
1857	Sheriff, Thomas	Mr. Macfarlan	Edinburgh
1862	Simpson, James	Mr. Halliday	Manchester
1855	Simpson, Thomas	Mr. Allen	Boston
1854	Slater, Henry	Mr. Asling	Spalding
1856	Smart, Benjamin	Messrs. Lea & Co.	Worcester
1862	Smith, Edward	Mr. Savage	Brighton
1853	Smith, Frank de Carle	Mr. Wright	London
1854	Smith, Frederick	Mr. Foster	Ludlow
1864	Smith, John	Mr. Halliday	Manchester
1859	Smith, George Henry	Mr. Tonge	York
1860	Smith, Herbert Geo.	Mr. Witherington	Worcester
1858	Smith, Hubert	Mr. Luff	Oxford
1854	Smith, James W.	Mr. Coulson	Scarborough
1860	Smith, Rawson	Mr. Davis	High Harrogate
1862	Smith, Robert Ayre	Mr. Hemming	Bishopwearmouth
1860	Smith, Thomas Hoskins	Mr. Rook	Sittingbourne
1864	Smith, Walter Henry	Mr. Burden	London
1864	Smithyman, Joseph	Mr. Buck	Dudley
1859	Smyth, Samuel Walton	Mr. Sims	Barnsbury
1864	Solomon, Francis	Mr. Lamplough	London
1858	Soole, Seymour Henry	Mr. Jessopp	Bishop Stortford
1860	Sproat, Robert	Mr. Parker	Derby

Date of Regis-tration	NAME.	RESIDING WITH	TOWN.
1861	Spurling, William	Mr. Watts	Chatham
1862	Squire, Frank R.	Mr. Asling	Spalding
1860	Squire, Peter W.	Mr. Squire	London
1858	Stanley, Robert Swan	Mr. Wortley	Durham
1854	Stanway, William H.	Mr. Blandford	London
1857	Stapleton, Thos. Glode	Mr. Collins	London
1864	Stevenson, James	Mr. Skinner	Cirencester
1864	Steward, John Alfred	Mr. Davis	Leominster
1862	Stewart, Robert	Mr. Stewart	Edinburgh
1862	Stebbing, Walter	Mr. Forbes	Reigate
1865	Stevens, Alfred Felix	Mr. Stevens	Strood
1853	Stiles, Mathew Henry	Messrs. Garratt	Rugby
1856	Stokes, Edward H.	Messrs. Lea & Co.	Malvern
1859	Stokes, Walter Edw.	Mr. Boully	London
1858	Stretton, Charles	Mr. Parker	Derby
1860	Sumner, Charles	Mr. Hill	Sheffield
1864	Swift, William Philip	Mr. Swift	Spalding
1862	Sykes, Edwin J.	Mr. Greaves	Bakewell
1857	Syer, John Witham	Mr. King	Soham
1859	Sutcliffe, J. Clarkson	Mr. Strachan	Barnsley
1856	Tanner, Augustus F.	Mr. Dickinson	London
1864	Tansley, Isaiah	Mr. Chaston	Lowestoft
1861	Tarner, Alfred P.	Mr. Blades	London
1865	Tate, Alfred T.	Mr. Williamson	Scarborough
1862	Taylor, Henry Hylton	Mr. Taylor	Middlesborough
1855	Teed, David	Mr. Pasmore	Exeter
1865	Thomas, Adolphe H.	Mr. Walker	Bath
1854	Thomas, George S.	Mr. Outhwaite	Bradford
1865	Thompson, John T.	Mr. Thompson	Richmond, Yorks.
1856	Thomson, Denzil	Mr. Witherington	Worcester
1858	Thomson, George G.	Messrs. Macfarlan	Edinburgh
1860	Topliss, Richard	Mr. Brearey	Douglas
1856	Towerzey, Alfred G.	Mr. Towerzey	London
1857	Trewavas, Richard J.	Mr. Job	Truro
1864	Trist, Richard	Mr. Turney	Plymouth
1856	Trotter, Joseph	Mr. Brown	York
1857	Truman, George F.	Mr. Wellington	Oakham
1853	Turner, John	Mr. Payne	Alesbury
1864	Turnbull, Thomas Collings	Mr. Reading	Warwick
1856	Twinberrow, James K.	Mr. Twinberrow	London
1859	Vacher, A.	Messrs. Bullock & Reynolds	London
1855	Vooght, William	Mr. Twinberrow	London
1846	Wakefield, Cecil H.	Messrs. Lea & Co.	Worcester
1861	Walker, Alfred	Messrs. Durant	Dorking
1849	Walker, Charles	Mr. Walker	Hogthorpe
1857	Walker, George	Mr. Goodall	Derby
1854	Walker, Joseph	Mr. Witherington	Worcester
1861	Walker, Samuel	Mr. Wilson	Sheffield
1861	Walker, Walter T.	Mr. T. Hazell	Maidstone
1859	Walker, William H.	Mr. Headley	Bridlington Quay

Date of Registration.	NAME.	RESIDING WITH	TOWN.
1857	Wall, John Thomas	Mr. Butcher	Cheltenham
1853	Walls, Thomas	Mr. Barber	Liverpool
1855	Walton, Ralph	Mr. Ritson	Sunderland
1865	Ward, John S.	Mr. Brayshay	Stockton-on-Tees
1857	Warren, Thomas P. B.	Mr. Pasmore	Exeter
1865	Warrior, Henry	Messrs. Maud & Wilson	Bradford, Yorks.
1858	Waters, Alexander	Mr. Corrie	Bedford
1860	Watkins, Richard	Mr. Fowler	London
1857	Watson, Thomas D.	Messrs. Martindale & Son	Carlisle
1861	Watts, Charles C.	Mr. Clarke	Richmond, S.W.
1857	Webber, Charles F.	Mr. Edwards	Sidmouth
1859	Webster, George O.	Mr. Seddon	Manchester
1858	Webster, George W.	Mr. Webster	Warrington
1861	Welch, Thomas Kemp	Messrs. Randall & Son	Southampton
1853	Wheeler, James	Mr. Payne	Aylesbury
1855	Wheeler, Joseph W.	Mr. Owen	London
1859	White, Alfred	Mr. Mount	Canterbury
1862	White, James Walter	Mr. Groves	Weymouth
1856	White, John G.	Mr. Ransome	Hitchin
1861	White, William	Mr. Bottle	Dover
1856	Whitehouse, George H.	Mr. Tonge	York
1853	Whitworth, John	Mr. Lowe	Liverpool
1862	Wilkinson, James	Mr. Bartlett	Chelsea
1864	Wilkinson, Thomas	Mr. Wilson	Sheffield
1858	Willan, James R.	Mr. Pratt	Wolverhampton
1860	Williams, Robert H.	Mr. Jones	Rhyl
1860	Williams, W. P.	Messrs. Williams & Fitzhugh	Nottingham
1859	Wilson, Francis	Mr. Lord	Rochdale
1852	Wilson, William	Mr. Rainey	Spilsby
1864	Wilson, Thos. Davison	Messrs. Dobinson & Son	Sunderland
1856	Witherington, Henry	Mr. Witherington	Worcester
1857	Wood, Albert	Mr. Watkins	Walsall
1862	Wood, Frederick	Mr. Glass	Cheltenham
1854	Wood, John Robert	Mr. Simmonds	Boston
1861	Woodcock, James	Mr. Cutting	Leamington
1864	Woodstock, Charles Edmund	Mr. Hawkins	Southampton
1863	Wylde, Samuel	Mr. Heaton	Manchester
1858	Wyman, John	Mr. Gulliver	Lutterworth
1855	Yerworth, Edmund	Mr. Binge	Pimlico
1857	Young, John	Mr. Mackay	Galashiels

LOCAL SECRETARIES, 1865-66.*

Aberdeen	Davidson, Charles
Abingdon	Ballard, William
Andover	Dyson, John
Anglesea	Jones, Henry
Ashton-under-Lyne	Bostock, William
Aylesbury	Dickins, Rowland
Banbury	Beesley, Thomas
Barnstaple	Cotton, Gilbert K.
Basingstoke	Hulbert, Robt. S.
Bath	Pooley, John C.
Bedford	Cuthbert, John M.
Belper	Brown, Charles
Berwick	Carr, William G.
Beverley	Hobson, Charles
Bewdley	Newman, Robert
Bilston	Lidington, George
Birkenhead	Jones, Charles
Birmingham	Southall, William, jun.
Blackburn	Booth, James
Bodmin	Williams, Joseph D.
Bolton	Dutton, George
Boston	Thomas, John H.
Bradford (Yorks.)	Pratt, John
Bridgewater	Payne, Reuben C.
Bridgnorth	Deighton, Thomas M.
Bridlington	Headley, Morris
Bridport	Beach, Thomas
Brighton	Gwatkin, James T.
Bristol	Stoddart, William W.
Buckingham	Sirett, George
Burnley	Thomas, Richard
Bury St. Edmunds	Portway, John
Cambridge	Deck, Arthur
Canterbury	Harvey, Sidney
Cardiff	Joy, Francis W.
Cardigan	Davies, David
Carlisle	Moss, William
Carmarthen	Davies, Richard M.
Carnarvon	Owen, Griffith
Chatham	French, Gabriel
Chelmsford	Baker, Charles P.
Cheltenham	Smith, Nathaniel
Chertsey	Boyce, John P.
Chester	Grindley, William
Chichester	Pratt, John
Christchurch	Judd, William
Cirencester	Mason, Joseph W.
Cockermouth	Bowerbank, Joseph
Colchester	Manthorp, Samuel
Congleton	Goode, Charles
Coventry	Wyley, John
Croydon	Crafton, Ralph
Darlington	Abbott, John T.
Dartmouth	Rees, William H.
Deptford	Atkins, Ernest
Derby	Goodall, Henry
Devizes	Madge, James C.
Devonport	Row, Charles
Doncaster	Dunhill, William
Dorchester	Davis, John
Dorking	Clark, William W.
Dover	Bottle, Alexander
Droitwich	Green, John
Dudley	Hollier, Elliot
Dundee	Hardie, James
Dunfermline	Brown, William
Durham	Robson, George
Edinburgh	Mackay, John
Evesham	Dingley, Richard L.
Exeter	Palk, John
Eye	Bishop, Robert
Falmouth	Newman, Walter
Fareham	Peat, Walter
Flint	Roose, Robert
Forfar	Rankin, James A.
Glasgow	Kininmont, Alexr.
Gloucester	Pearce, Thomas
Goole	Hasselby, Thos. J.
Grantham	Hall, Thomas
Guernsey	Arnold, Adolphus
Guildford	Martin, E. W.
Halifax	Jennings, William
Harrogate	Coupland, Joseph
Harwich	Bevan, Charles F.
Hastings	Amoore, Charles
Haverfordwest	Saunders, David P.
Helston	Guy, Guy
Hereford	Jennings, Reginald
Hertford	Lines, George
Honiton	Rogers, J. R.
Horncastle	Elsey, John
Horsham	Williams, Philip
Huddersfield	Higgins, Thomas S.
Hull	Earle, Francis
Huntingdon	Bryant, William
Hyde (Cheshire)	Brocklehurst, James
Hythe	Thomas, James
Ipswich	Wiggin, John
Jersey	Ereaut, John
Kendal	Metcalfe, John Sykes
Kidderminster	Steward, Josiah
Kilmarnock	Rankin, William
King's Lynn	Wigg, John G.
Kingston on Thames	Gould, Frederick
Lancaster	Wearing, William
Launceston	Eyre, Thomas S.

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

Leamington	Colbeck, Geo. R.
Leeds	Reynolds, Richd.
Leicester	Cooper, Thomas
Leighton Buzzard	Readman, William
Leominster	Davis, D. Frederick
Lewes	Martin, Thomas
Lincoln	Peppercorn, Benj.
Liskeard	Eliott, Samuel
Liverpool	Edwards, John B.
Ludlow	Wells, Edwin
Lyme Regis	Thornton, Edward
Lymington	Allen, Adam U.
Macclesfield	Wright, George W.
Maidenhead	Thompson, Chas. H.
Maidstone	Argles, Henry
Maldon	Wallworth, David
Malmesbury	Walker, William
Manchester & Salford	Wilkinson, William
Margate	Dyer, John
Melton Mowbray	Wing, Thomas N.
Merthyr Tydfil	Smyth, Walter
Monmouth	Dawe, Sampson
Narberth	Jones, David
Newark	Harvey, John
Newcastle-un.-Lyne	Cartwright, William
Newcastle-on-Tyne	Brady, Henry B.
Newport (Monm.)	Jones, Thomas J.
Northallerton	Warrior, William
Northampton	Barry, Edwin
Norwich	Sutton, Francis
Nottingham	Atherton, J. H.
Oldham	Hargraves, H. L.
Oswestry	Smale, Richard B.
Oxford	Walsh, Edward
Penrith	Kirkbride, William
Penzance	Cornish, Henry R.
Perth	Dandie, David
Peterborough	Parnell, John
Plymouth	Gibbons, William
Poole	Penney, William
Portsmouth	Rastrick, James L.
Preston	Houghton, William
Ramsgate	Morton, Henry
Reading	Cooper, Lewis
Reigate	Forbes, William
Retford	Baker, William
Richmond (Surrey)	Hopwood, Henry S.
Richmond (Yorks.)	Thompson, Thomas
Ripon	Judson, Thomas
Rochdale	Taylor, Edward
Rochester	King, Thomas S.
Rothesay	Duncan, William
Rugby	Garratt, John C.
Ruthin	Bancroft, John J.
Ryde	Wavell, John
Rye	Plomley, J. F.
Salisbury	Atkins, Samuel R.
Sandwich	Duncan, F. M.
Scarborough	Coverley, John
Selby	Colton, Thomas
Shaftesbury	Powell, John
Sheffield	Radley, William V.
Shields, North	Brown, William H.
Shields, South	Mays, Robert J. J.
Shrewsbury	Cross, William G.
Southampton	Palk, Edward
Southport	Garside, Burdett
St. Albans	Davenport, Edward
St. Leonards	Davis, John O.
Stalybridge	Brierley, Richard
Stamford	Patterson, George
Stockport	Shaw, A. H.
Stockton	Brayshay, Wm. B.
Stoke-on-Trent	Adams, J. H.
Stourbridge	Bland, John H.
Stowmarket	Simpson, Thomas
Stroud	Blake, William F.
Sunderland	Ritson, John G.
Swansea	Brend, Thomas
Taunton	Prince, Henry
Tavistock	Gill, William
Tewkesbury	Wilkes, Seth M.
Thirsk	Thompson, John
Tiverton	Bond, L. V.
Torquay	Glanfield, George
Truro	James, John
Tunbridge Wells	Gardener, Charles.
Uxbridge	Chave, John
Wakefield	Gissing, Thomas W.
Wallingford	Payne, Sidney
Walsall	Watkins, George H.
Wandsworth	Nind, George
Wareham	Randall, Thomas
Warminster	Toone, J. V.
Warrington	Redmayne, Christr.
Warwick	Reading, R. G.
Wenlock, Much	Edwards, William
Westbury	Taylor, Stephen
Weston-super-Mare	Rich, Thomas
Weymouth	Groves, Thomas B.
Whitehaven	Randleson, William
Wigan	Barnish, E. H.
Wilton	Tuck, John
Winchester	Powell, Edward
Windsor	Russell, C. J. L.
Wolverhampton	Brevitt, W. Y.
Woolwich	Rastrick, John A.
Worcester	Witherington, T.
Worthing	Cortis, Charles
Wycombe	Hall, John B.
Yarmouth	Poll, William S.
York	Davison, Ralph