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AND

TRANSACTIONS.

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CONTENTS.

SECOND SERIES, VOL. VII.—1865-6.

No. I.

No. II.

No. III.

No. IV.

No. V.

No. VI.

No. VII.

No. VIII.

No. IX.

No. X.

No. XI.

No. XII.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VII.—No. I.—JULY 1st, 1865.

THE PHARMACY BILLS.

The Select Committee on the Pharmacy Bills have completed their work and reported to the House. There is to be no legislation on pharmacy this Session, and, as the Committee think, there should be no legislation at all in the direction in which we had suggested it.

In our last number we stated what the conclusions were to which the Committee had then arrived, and we expressed the opinion that although the first resolution of the Committee would necessarily render imperfect the accomplishment of what we were seeking, there was still room to hope that something beneficial might be accomplished: at the same time we expressed our doubts whether anything worth accepting would emanate from that source.

After deciding that compulsory registration should not be required from persons now carrying on the trade of chemists and druggists, and that examination and registration in future should be made to apply only to those engaged in the sale of dangerous drugs, of which a schedule should be provided, the Committee finding that the provisions of Bill No. 1 did not in any way accord with these objects, proceeded to consider the provisions of Bill No. 2. They did not, however, take any evidence with reference to this part of the subject, but appear to have merely considered how far Bill No. 2 would serve to carry out what they had decided on recommending.

In the first two or three clauses, which merely define the title of the Act, the time at which it should come into force, and the necessity for a council to carry it into operation, there was nothing found that appeared to present any difficulty; but then came the clauses relating to the election of the proposed council, and here, the Committee say, "considerable difficulty arose," upon which they relinquished the task in despair.

The ultimate conclusion to which the Committee came was, that it was not expedient to proceed further with either of the Bills which had been committed to them, but that the Government be recommended to bring in a Bill early in the new Parliament on the subjects referred to the Committee.

It thus appears that after all the exertions that have been made in endeavouring to obtain further legislation with reference to pharmacy, we are left for the present without any practical result. We must still look to the future, and prepare for renewed efforts in a new Parliament. We do not think that our cause has been weakened by any thing that has been done, or that there is reason to despair of ultimate success. On the contrary we shall be able to appeal to the statements that have been made in and out of Parliament, to the evidence that has been given before the Committee, to the recommendation of the Medical Council, and to the petitions not only of a great majority of the chemists and druggists throughout the country, but of about two thousand of the leading medical and other scientific men, who have advocated our cause; and all this testimony in our favour cannot fail to further our object on any future occasion. Even the experience we have acquired in our unsuccessful efforts at legislation may be of use in guiding us to a better result hereafter. In going to Parliament with a view to the accomplishment of what we want, it is necessary to study the feelings of the Legislature, to observe what principles are recognized in legislation, and to shape our course in accordance with the prevailing indications in these respects.

If the opinions of the Select Committee are to be taken as representing those of the Legislature, it will be necessary that we should change our course or relinquish our object. We cannot think that the decisions of the Committee are altogether in accordance with the opinions of the House of Commons, nor is it certain that the new House will precisely accord with that which is now dying out; but it seems probable from what has occurred on the present as well as on former occasions, that the regulation of the sale of dangerous drugs will be made the ostensible object of any extension of pharmaceutical legislation that we may be able to obtain.

It would be much to be regretted in passing any measure relating to this subject, that there should be no provision made for the registration of existing chemists and druggists, and that the qualification to be required in those who in future shall be registered, should relate to the sale and not to the compounding of dangerous drugs. These are points with reference to which the suggestions of the Committee are very defective, but if these defects were remedied, it would be quite possible, we believe, to frame a Bill in accordance with the other suggestions made that would meet the requirements of the case, and afford a reasonable prospect of a satisfactory accomplishment of what is required.

THE PROPOSED GRANT OF PENSIONS FROM THE BENEVOLENT FUND.

We cannot refrain from congratulating our readers on the announcement in this present Journal that the Council of the Pharmaceutical Society has decided on granting two annuities from the Benevolent Fund, each of the value of £30, if proper candidates present themselves for such assistance.

The scheme, arranged some years ago, for the distribution of this fund, contemplated permanent as well as casual relief, but it was deemed advisable to delay such application until the invested capital had reached the sum of £10,000. That proposition was, we believe, made when the subscription to the Pharmaceutical Society, both from members and associates, was higher than it now is, and when periodical grants might be calculated on from the General to the Benevolent Fund. On the reduction of the subscription to half the original sum, the income of the Society (which has other great duties to fulfil) did not justify these grants, and the Benevolent Fund consequently did not increase in the anticipated rate. It is, however, gratifying to know that the Council never felt it necessary to refuse aid to an applicant, and yet never trenched on "capital" in granting it. But of late years a more active spirit has been brought to bear on this question, and a considerable augmentation, both in donations and annual subscriptions, has taken place,—an augmentation sufficient to justify the commencement of annuities before the proposed standard of capital has been reached. We presume, in sound policy, it is intended still to limit the expenditure, so that until £10,000 be accumulated it shall never exceed the interest on the invested fund, treating donations and subscriptions for the present as capital, and we think such a rule should be rigidly adhered to; but we feel assured the attainment of that object will be advanced rather than retarded by the present action. Whatever brings a benevolent fund under notice advances it, doubly so if notice be attracted by the benefits it confers on those for whom it was instituted. The invested capital now amounts to about £7000. A subscription of even 5*s.* a year from every member and associate of our Society would soon make the necessary increase, but a subscription of half-a-guinea would give to the subscriber not only the satisfaction of contributing to the relief of others less fortunately placed than himself, but the power also to direct that relief by his vote on the day of election. We may draw attention to the revised code of regulations for the distribution of the Benevolent Fund, published in January last, page 360, Vol. VI., 'Pharmaceutical Journal,' and it is particularly necessary that on this, the first occasion on which the members and associates of the Society generally, and all subscribers of half-a-guinea to the fund will be called to exercise their right of voting, they should make themselves acquainted with the mode of proceeding.

As to candidates, there can be little doubt that the drug trade, which seldom affords opportunities for large accumulations, has left some of its members (who are our members also) stranded on the shoals of adversity, to whom an annual grant of £30 will be a comfort in their declining years; and we may fairly anticipate, that although in the infancy of the Society no such cases have presented themselves, they will arise hereafter. Time, which consolidates the body corporate, tells differently on individuals. We should be prepared for all eventualities, and let it never be forgotten that one of the chartered duties of the Pharmaceutical Society is to provide a fund for the relief of its necessitous members and associates, their widows and orphans.

PROPOSED IMPOSITION OF DUTY ON PURIFIED WOOD-SPIRIT.

Allusion has been made on former occasions in this Journal (see Vol. IV., N. S., page 244, etc.) to the purification of Wood Spirit by Eschwege's process. This process, which consists in passing the spirit largely diluted with water through a succession of tubes filled with coarsely granulated charcoal, was patented a few years ago, and specimens of wood naphtha, purified by means of it, were exhibited at the International Exhibition of 1862, labelled "Potable Naphtha." The subject has attracted a good deal of attention, not only on account of the apparent facility with which pyroxylic spirit may be thus obtained in a great state of purity, by a process which seems to be applicable to operations on a large scale, and which is represented as inexpensive, but also because it has been thought that by similar means methylated spirit might be purified so as to frustrate the object of the Legislature in allowing the use of such spirit duty-free. The purification of methylated spirit, however, is illegal, and the vigilance of the excise officers, with the powers they possess, may be sufficient to protect the revenue against any fraudulent attempts in that direction. But there is at present no law against the purification of wood spirit, and if, as has been stated, this naphtha can be purified so as to render it potable and almost undistinguishable in flavour and effects from spirit of wine, may it not be expected that it will find its way into some of the cheap spirituous beverages? In its crude or partially purified state, wood spirit or methylic alcohol has long been known as a volatile liquid, possessing many of the properties of spirit of wine, and especially the property of dissolving resinous substances, for which it has principally been used. But it has always been contaminated with pyrogenous substances, which have given to it a very offensive taste and odour, and the presence of these properties has entirely precluded its application as a substitute for spirit of wine in the preparation of spirituous beverages. It was the existence of the offensive flavour it always possessed, as met with in commerce, that led to its adoption as a suitable substance to be added to spirit of wine, to prevent the latter, when sold duty-free for manufacturing purposes, from being used as a beverage. Commercial wood-spirit still continues to answer this purpose perfectly well, and there is no reason to believe that the revenue suffers to any material extent, beyond what was contemplated, from the use of methylated spirit. The manufacture, sale, and use of this spirit are sufficiently under the observation and control of the excise to enable them to protect the revenue. It is not from the sale or use of wood spirit in its ordinary commercial state, or of methylated spirit which is made with ordinary commercial wood-spirit, that danger to the revenue is apprehended, but from the introduction into commerce of wood spirit or methylic alcohol, so far purified that it is entirely deprived of its offensive flavour. Such a spirit is now offered for sale at about half the price of spirit of wine. It appears that this purified wood-spirit or methylic alcohol has already been added to some of the cheap spirits used for drinking, and it is feared that this practice may be carried to a greater extent. To meet this existing and possibly growing evil, it is proposed, by a Bill now before Parliament, to impose a duty on wood spirit or methylic alcohol, when purified so as to render it fit for drinking. The following clauses form part of "a Bill to Amend the Laws Relating to the Inland Revenue:"—

"27. And whereas it is discovered that potable spirits may be obtained from methylic alcohol by distilling the same after certain processes of purification, by which it is freed from the unpalatable flavours which pertain to it in its crude state, and it is expedient to subject such spirits to the duty of excise chargeable on spirits: Be it enacted, That any liquid containing or having mixed therewith methylic alcohol which shall have been purified or prepared for distillation by means of filtration, or any other process which may free it or be intended to free it wholly or partially from any flavour or odour which might otherwise pertain to it, shall be deemed to be low wines for the purpose of distillation within the meaning of the laws of excise relating to the distilling of spirits; and every person making, preparing, or having in his possession any such low wines, and having also a still, shall be deemed to be a distiller liable to the several duties, penalties, and forfeitures imposed by law on distillers of spirits.

"28. Methylic alcohol which shall have undergone any such process of filtration or purification as aforesaid shall be deemed to have been so prepared for the purpose of distilling spirits therefrom, and no person other than a person duly licensed as a distiller of spirits shall so prepare or purify any methylic alcohol, nor shall any such process as aforesaid be commenced or carried on elsewhere than on premises duly licensed as a distillery, and of which, together with the stills, vessels, and utensils to be used therein, due entry shall have been made with the officers of excise, under pain of such penalties and forfeitures and liability to seizure for any breach of this enactment as would or might be incurred by any act done in contravention of the third section of the Act passed in the twenty-third and twenty-fourth years of Her Majesty's reign, chapter one hundred and fourteen.

"29. The distilling of spirits from any such low wines as aforesaid shall be carried on under and subject to the like rules, regulations, and conditions as are prescribed by the laws in force in relation to the distilling of spirits, and the spirits produced by such distillation shall be deemed to be British spirits chargeable with the duties of excise, and shall be subject to all the laws, provisions, and regulations relating to British spirits: Provided always, that where it shall be made to appear to the Commissioners of Inland Revenue that any of such rules, regulations, or conditions are inapplicable to the making, preparing, or distilling of such low wines as aforesaid, or impose too great a restriction on such distillation, it shall be lawful for the said Commissioners to relax or dispense with any of such rules, regulations, or conditions, and to frame others in lieu thereof for the purpose of regulating and facilitating the business of the said distillation, and otherwise in relation thereto, as they shall see fit in that behalf."

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

MEETING OF COUNCIL, *7th June*, 1865,

Present—Messrs. Bird, Bottle, Brady, Deane, George Edwards, Hanbury, Haselden, Hills, Morson, Orridge, Randall, Sandford, Savage, Squire, Standring, Watts, 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 following were appointed on the several Committees and Boards of Examiners:—

COMMITTEES.

General.—Messrs. Bird, Davenport, Deane, George Edwards, Hanbury, Haselden, Morson, Orridge, Squire, Watts, and Waugh.

Finance.—Messrs. Bird, Davenport, Haselden, Orridge, and Watts.

Library, Museum, Laboratory, and House.—Messrs. Davenport, Deane, George Edwards, Haselden, Morson, Orridge, Squire, Watts, and Waugh.

Benevolent Fund.—Messrs. Hanbury, Orridge, Squire, Watts, and Waugh.

Parliamentary.—Hanbury, Deane, George Edwards, J. B. Edwards, Haselden, Orridge, Morson, Randall, Squire, and Waugh.

BOARD OF EXAMINERS for England and Wales.

Messrs. Abraham, (*Liverpool*); Bird, Augustus; *Brady (*Newcastle*); Cracknell; Darby; *Davenport; *Deane; *Edwards, George; *Edwards, J. B. (*Liverpool*); *Evans (*Liverpool*); Gale; Garle; Giles (*Clifton*); Hanbury, Daniel; *Haselden; *Morson; Proctor, B. S. (*Newcastle*); Reynolds (*Leeds*); Schacht (*Clifton*); Southall, W., jun. (*Birmingham*); *Squire; *Standring (*Manchester*); Wilkinson (*Manchester*); Woolley (*Manchester*).

Board of Examiners for Scotland.—Messrs. Ainslie, Aitken, D. R. Brown, Gardner, Kemp (Portobello), Noble, Tait, Young, and the Secretary (*Mr. Mackay).

The President and Vice-President are on all Committees *ex officio*, and on the respective Boards of Examiners in London and Edinburgh.

The Local Secretaries, on the Report of the Scrutineers, were appointed for the ensuing year, and the List was ordered to be published in the July number of the Journal and Transactions.

Resolved that free Laboratory Instruction be given to the Bell Scholars, for the Session of 1865–66.

The following were elected—

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* Members of the Council.

MEMBERS.

Robert Bird	Clapham.
George L. Napier	Exeter.
Thomas Edmunds Morris	New Brighton.
Edwin Balch	North Brixton.
James Williamson	North Shields.

BENEVOLENT FUND.

Resolved that in accordance with the revised Regulations for the distribution of this Fund, an election of two Annuitants take place in October next,—the annuities to be of the value of thirty pounds each.

Donations and subscriptions to the Benevolent Fund since April:—

DONATIONS.

	£.	s.	d.
Lea and Perrins, Worcester	£50	0	0
Spokes, Peter, Reading	5	5	0

SUBSCRIPTIONS.

Country.

	£.	s.	d.
Brighton, Savage, William D.	0	10	0
Bristol, Sircom, Richard	0	5	0
Bromley, Baxter, W. W.	0	10	6
Birmingham, Southall Son and Dymond	1	1	0
Birmingham, Musson, T. G.			
Chertsey, Boyce, John Pierce	0	5	0
Coningsby, Brown, Samuel	0	5	0
Crewkerne, Stawson, Henry	0	10	6
Crickhowell, Christopher, W.	0	5	0
Denbigh, Edwards, W.	0	5	0
Exeter, Palk, John	0	10	0
,, Tanner, Nicholas W.	0	5	0
,, Husband, Matthew	0	10	0
,, Cooper, George	0	10	0
,, Stone, John	0	5	0
Exmouth, Thornton, Samuel	0	10	6
Faringdon, Ballard, Edwin	0	10	0
Hereford, Hustwick, Thomas H.	0	5	0
Heavitree, Brailey, Charles	0	5	0
Maidstone, Rogers, William	0	5	0
Manchester, Hayward, Charles	1	1	0
Preston, Hogarth, William	1	1	0
Ramsgate, Morton, Henry	0	5	0
Stamford, Patterson, George	0	10	0
St. Leonards, Maggs, S. B.	1	1	0
Stourbridge, Nicholls and Perks	0	3	6
Tenterden, Bolton, Thomas	0	5	0
Torpoint, Down, Richard H.	0	10	6
Wandsworth, Nind, George	0	10	6
Waterloo, Pheysey, R.	1	1	0
Windsor, Russell, Charles J. L.	0	10	6
Wymondham, Skoulding, W.	0	5	0
Yarmouth, Bond, John	0	5	0

London.

	£.	s.	d.
Attfield, J., 17, Bloomsbury Sq.	1	1	0
Fenn, John T., Westminster	0	5	0
Goodwin, John, Lower Clapton	0	10	6
Goosey, William, 6, Ocean Row	0	10	6
Harper, G., 338, Oxford Street	0	5	0
Pratt, E., 27, Bishopsgate Street	1	1	0
Stathers, J., 43, Notting Hill	0	10	6
Tibbs, F., 47, Blackfriars Road	0	10	6
Turner, C. E., Great Russell St.	0	10	6

EXAMINATION, 21*st June*, 1865.

MAJOR.

Rose, Alfred	London.

MINOR.

Applegate, Sidney	London.
Arkinstall, William	Cheltenham.
Barnes, Lawrence Robert	Preston.
Braund, Henry Humphrey John	Crediton.
Brownen, George	Christchurch.
Ellinor, George	Rotherham.
Ellis, Henry Brook	Clifton.
Fisher, John Albert	Liverpool.
Foulkes, William	Abergele.
Mumford, Alfred	Westbury.
Nicholson, Henry	Blackheath.
Tunley, John	West Bromwich.

REGISTERED APPRENTICES.

Name.	Residing with	Address.
Barrow, James	Mr. Wilshaw	Wordsley.
Blackett, John Henry	Mr. Morton	Durham.
Cross, William Gowen	Mr. Cross	Shrewsbury.
Hearne, Frederick	Mr. Stevens	Strood.
Jones, Elias Richard	Mr. Brearey	Douglas, I. M.
Lambert, William R.	Messrs. Parsons, Richardson and Co.	Leicester.
Oldham, Thomas	Mr. Sandiland	Bicester.
Parkin, Charles	Mr. Hodgson	Stockton-on-Tees.
Sandiland, Robert Burgess	Mr. Jones	Kingston-on-Thames.
Shillito, William John	Mr. Dyer	Halifax.
Stevens, Alfred Felix	Mr. Stevens	Strood.
Timons, James Lewis	Mr. White	Bedford.
Wavell, Edward	Mr. Littlefield	Ventnor, I. W.
Westacott, William		

ORIGINAL AND EXTRACTED ARTICLES.

ON SPIRIT OF NITROUS ETHER AND NITRITE OF SODA.

BY ROBERT WARINGTON, F.R.S., F.C.S.

The spirit of nitrous ether, as a pharmaceutic compound, dates back to a very early period. In the thirteenth century, in the writings of Raymond Lully, its preparation is mentioned, and two hundred years afterwards an improved process for making it is given by Basil Valentine. A very good idea of the nature of these old processes, and of the curious state of chemistry a century and a half since, may be obtained by perusing the 'Dispensatory' of Dr. Bates on this subject; the second edition of which work, published in the year 1700, by Dr. Salmon, imparts such a graphic idea of the state of the manufacturing processes of pharmaceutic chemistry at that period, and the curious theories and quaint explanations of chemical action then current, that I feel I need hardly apologize for giving the account in detail. Dr. Bates, it appears from the preface, "was Physician to two Kings and a Protector" (Cromwell, Charles II., and James II.). In order clearly to understand the operation of making the sweet or dulcified spirit of nitre, it will be better that we should commence with the process for the spirit of nitre (nitric acid) employed. Some of the clauses which do not refer to the chemical part of the subject have been omitted. At p. 53, we have "Spiritus nitri, spirit of nitre. Bates). ℞ Sand p. ij, nitre p. j. Mix and distil bya retort till the fumes cease to appear. Salmon). § 1. Here is but p. ij of sand to p. j of nitre, which I judge too little; the *Colledge* in their Dispensatory allows 5 to 1, as you may see in our Pharm. Lond. lib. 3, cap. 10, sect. 47. But three to one is by experience found to be the best proportion. § 2. ℞ Pure nitre lb. ij; common bole, or potter's earth, lb. vj. Mix, and put them into a large earthen or glass retort luted, set it in a close reverberatory furnace fitting to it a large receiver; give a gentle fire for four or five hours, till all the flegm is come forth, which will be drop by drop. § 3. When it will drop no more, cast away the flegm in the receiver, and refit it, luting the juncture, increase the fire gradatim to the second degree, so will the spirit come forth, filling the receiver with white clouds, continue the fire in that equality for two hours, and then increase it to the greatest violence, and the vapours will be red, which continue till all is come over, which will be in about fourteen or fifteen hours. § 5. This spirit is the best *aqua fortis* that can be made. § 9. You must not fill the retort above two-thirds full, and the recipient must be very large, for that the spirits being strong and the vapours plentiful, and withal coming hastily forth, they would break all to pieces, if they had not room to expatiate in. § 10. This spirit, from its coming forth in red vapours, is by some authors called *the Salamander's Blood*, and being thus at first freed from its flegm, will act with so much the more force. § 11. This spirit will dissolve or rather corrode all metals, except gold, into which it cannot enter alone by reason of the smallness of the pores of that metal; but if you add to it a fourth part of its weight of sal armoniack, or of sea salt, or of sal gem, it will give a new form to its particles, shaping them into more subtil points capable of entering into the pores of the gold, and to penetrate and dissolve its substance."

At p. 54, we have "Spiritus nitri dulcis, dulcified spirit of nitre. Bates). ℞ Spirit of nitre p. j, alcohole of spirit of wine p. ij. Digest till they are joined, and distil in sand, cohobating twice, S. A. Salmon). § 1. This proportion of 1 to 2 is that which is observed by Le Mort, Maets, and Margrave; but Rolfincius, Chirras, and Lemery make the mixture in equal parts of each. § 2. In mixing them you must be very cautious, and do it leisurely and by degrees; you must not put the spirit of wine to the spirit of nitre, for then you will set it all on a flame. § 3. But you must put in the spirit of nitre gradatim into the spirit of wine, so you will prevent the flaming, but the mixture will grow so hot, that you will scarcely be able to hold your hand on the outside of the vessel. § 4. Being mixed together, digest for seven days, then put the mixture into a glass retort, and distil in sand, first with a gentle heat, and afterwards with a stronger, to driness. § 5. The receiver let be very large, and the neck of the retort fit for it, and so enter a good way in, and the juncture to be well luted, for otherwise you will lose much of your spirit. § 6. It is necessary that the spirit should be cohobated twice at least, some authors advise thrice; for the oftener it is cohobated the sweeter it is. § 12. In this mixture the spirit of nitre joyns itself to the sulphur of the wine, and both being admirably volatile, they strive to mount upwards, whereby the mixture is put into that mighty motion and effervescency; and from whence results a complicate spirit, being most fragrant, and having the greatest volatility. § 14. Rolfincius, in Chemia, lib. 3, sect. 1, art. 4, cap. 11, advises after four days digestion to distil it in an alembick, so, says he, will the spirits in this operation be united, and contract a violet kind of odour or smell, and a subdulce and grateful taste."

Now this process, of acting upon spirit of wine by nitric acid, has been handed down in the various editions of our Pharmacopœias with very little alteration, except in the employment of more definite materials, until within comparatively a few years since. The nitric acid and rectified spirit have varied in their proportions in the different Pharmacopœias, from one of acid and three of spirit to one of acid and seventeen and a quarter of spirit. The product has been variously designated as spiritus nitri dulcis, spiritus ætheris nitrosi, spiritus ætheris nitrici, spiritus æthereus nitrosus; the more common commercial terms however have been, spirit of nitre, sweet spirit of nitre, or sometimes simply nitre.

In 1826 the Dublin College introduced nitrous ether into their list of preparations. The process consisted in submitting to distillation a mixture of dry nitrate of potash 24 oz., of strong sulphuric acid 16 oz., and rectified spirit 19 fl. oz. The acid and spirit being first mixed together and allowed to cool before addition to the nitrate of potash. The distillation is ordered to be slowly and carefully conducted, and the uncondensed vapours passed into another vessel through 16 oz. of spirit kept cold. This ethereal liquid is then to be purified by agitation with dry carbonate of potash. If required very pure it is to be redistilled by a water-bath at 140° F. until one-half has passed over. It has a specific gravity ·900. The process is stated to be that of Wolfe, and has been found by Pelletier to succeed better than any other.

In the year 1839 the Edinburgh College also gave a process for the preparation of nitrous ether, but simply as a preliminary step in the manufacture of spirit of nitrous ether. The method directed is to add by degrees, through a safety tube in a matrass, 7 fl. oz. of nitric acid, of 1·5 specific gravity, to 15 fl. oz. of rectified spirit, taking care that the action is not too violent, and that the receiver be kept cooled. The ether thus obtained is purified from acid by a little milk of lime, and from water and spirit by a concentrated solution of chloride of calcium (muriate of lime). The product ("pure hyponitrous ether") thus obtained should have a density ·899. This is then mixed with four times its volume of rectified spirit (so that the mixture would contain 20 per cent. of nitrous ether) and the resulting spirit of nitrous ether is stated to have the specific gravity ·847. This can hardly be correct, as the density of rectified spirit is ·838, and the mean of the volumes given above will yield a result of ·850. The gravity stated by the Edinburgh College would therefore entail an increase of volume on admixture which is not probable. The test given for the strength of spiritus ætheris nitrici is that, "when agitated with twice its volume of concentrated solution* of muriate of lime (chloride of calcium) 12 per cent. of ether slowly separates." Now as the proportion of ether added to the spirit was 20 per cent., it is evident that 8 per cent. is held in solution by the mixture of spirit and chloride of calcium. The last Dublin Pharmacopœia contained a process of a similar kind; that is, forming a nitrous ether by the action of nitric acid on spirit, purifying the product by ammonia, and mixing it with 10·5 volumes of rectified spirit, or with more than 2·5 times the quantity used by the Edinburgh College, making the product, of course, less than half the strength as regards the ether.

The spirit of nitrous ether met with in commerce I have never found to yield any ether by the chloride of calcium test, nor have I ever heard of any which did. It could not therefore contain more than 8 per cent. of ether, that being the point at which the test will begin to indicate. In the last process of the London College for 1851 the gravity of the product (obtained by the distillation of nitric acid with rectified spirit), is stated as below that of the spirit used, namely ·834, rectified spirit being ·838, which can only be accounted for as an increase in the percentage of alcohol by the slow distillation. The amount of nitrous ether present here must have been very small. Such then was the position of this manufacture, as far as regards officinal preparation, up to the time of the issue of the British Pharmacopœia.

The original formula suggested by the Dublin Pharmacopœia Committee, and handed to me, as Consulting Pharmaceutic Chemist to the London and Edinburgh Committees, for trial, was as follows:—" 6 oz. of nitrate of soda, 200 grs. of charcoal in very fine powder, $3\frac{1}{2}$ oz. of sulphuric acid, 25 fl. oz. of rectified spirit. Mix the nitrate of soda with the charcoal, both in fine powder, and deflagrate the mixture in small and successive portions in a Hessian crucible raised to a low red heat. Then increase the temperature to produce perfect liquefaction, pour out the salt on a clean flag, and when cool reduce it to powder. Place it in a mattrass connected with a condenser, and pour on the spirit and acid previously mixed. Distil over 20 fl. oz. Specific gravity ·835." By experiment, deflagrating at as low a heat as possible, this yielded a product having a specific gravity ·853, and giving by the chloride of calcium test 8 measures of ether per cent. separated, equal therefore to 16 per cent. really present, or 53 per cent. of nitrite of soda in the salt employed.

This formula was then altered by the committees to that which now stands in the Pharmacopœia, namely, 5 oz. nitrite of soda, 4 fl. oz. of sulphuric acid,

* This should be "saturated," as otherwise the test is most uncertain. This can only be ensured by always having undissolved crystals present in the solution employed, the point of saturation varying much with temperature.

40 fl. oz. of rectified spirit. Distil 35 fl. oz. (seven times the quantity of the nitrite employed). Specific gravity ·843. The preparation of the nitrite of soda was made a separate process, thus,—16 oz. nitrate of soda, 1¼ oz. of charcoal recently burned, and in fine powder : mix, and drop the mixture in successive portions into a clay crucible heated to dull redness. Raise the heat to liquefy it, and pour on to a clean flagstone. In carrying this operation into practice, it was found that 32 fl. oz. only could be obtained by distillation, and that it required the addition of more spirit to make up the yield to 35. The specific gravity, also, was ·850, and the percentage of nitrous ether below that indicated. In examining into the reason of this deficiency, it was found that on the addition of the mixed spirit and acid to the salt, a crust of sulphate of soda, in a comparatively insoluble state, was formed on the surface of the nitrite of soda, which enclosed and thus protected the remainder from the action of the acid, until a great deal of the spirit had distilled over, and that it was hence some time before much nitrous ether was produced. To prevent this the nitrite was first dissolved in 10 fl. oz. of water before the addition of the acid and spirit, and with this modification the whole quantity directed can readily be distilled off.

A great deal of difficulty, I believe, has arisen in preparing the nitrite of soda for this manufacture, and there can be no doubt that if great care is not observed in the process of deflagrating the nitrate of soda and charcoal, a considerable percentage of carbonate of soda or even caustic soda is formed, with, of course, an equivalent loss of nitrite. The proportion of charcoal ordered is indeed rather above the quantity required, 1·13 oz. being the calculated proportion instead of 1·25. One ounce, however, will be found practically sufficient. In working on the large scale, the process of deflagration is also a very tedious one, and if the workman endeavours to expedite his operations by the projection of too large a quantity of material at once into the heated vessel, the chemical action is increased to such an extent that he is sure to destroy a great deal of the nitrite he is endeavouring to prepare. As I had obtained such good results by controlling this operation within its lowest possible limits, it was attempted next to effect the partial deoxidation of the nitrate of soda without allowing deflagration to take place at all, and this at times has been very successfully performed ; but it has this great drawback, that despite all the caution employed, the mixture is always liable to burst suddenly into deflagration and even comparative explosion.

It was next tried to substitute a harder form of carbon for the purpose, and finely powdered plumbago was selected ; this is somewhat more manageable and under control, and has answered the purpose better. Several hundred pounds weight of salt, containing about 75 per cent. of nitrite of soda, have been manufactured by this means ; still at times we have had sudden bursts of deflagration, and this makes the men nervous, from its occurring when they were off their guard, and burning their clothes or skin.

My next experiment was to substitute for the charcoal an equivalent amount of carbon in the form of starch, and this has yielded us the most satisfactory results, and with very little trouble. Seven parts of dried nitrate of soda in fine powder is mixed with one of starch powder, and thrown by small quantities at a time into a shallow iron pan heated from below ; the mixture spumes and melts as the water and carbonic acid pass off, and the salt ultimately fuses. When it has become quite white, it is laded out and cooled. We have already made between three and four hundred pounds weight by this process, and without any annoyance from deflagration, the heat of course being carefully regulated. In these operations we have always employed iron vessels, as the metal vessel relieves us from the annoyance of loss arising from leakage or fracture of the earthen crucible and the small quantity of oxide of iron that is found mixed with the product, cannot in any way interfere with the after process. The spirit of nitre that has been produced from nitrite of soda thus prepared has yielded us, by the chloride of calcium test, 5 per cent. of separated nitrous ether, or 13 per cent. as a whole; and in consequence of this steady yield, we have been obliged to reduce the proportion of nitrite used in our manufacture to meet this excess of strength; the British Pharmacopœia ruling that the spirit is to yield $1\frac{1}{2}$ per cent. of nitrous ether when submitted to the test, or a total content of 9·5 per cent.

Assuming the specific gravity of the nitrous ether separated by the chloride of calcium to be ·899, as stated by the Edinburgh College, or ·900 as stated in the Dublin Pharmacopœia of 1826, the proportion of nitrite of soda directed by the British Pharmacopœia should yield, if pure, a spirit of nitrous ether containing 17·25 per cent.* The above result, 13 per cent., would imply a percentage of nitrite of soda in the salt used equal to 75·34,† a conclusion which has been further confirmed by the amount of nitrogen gas evolved by decomposing the salt with chloride of ammonium. On the same basis of calculation it would require the nitrite of soda used to contain 55·07 per cent. of real nitrite in order to produce the strength specified by the British Pharmacopœia, and 46·32 to bring the mixture of spirit and test liquor up to the point of saturation, or 8· per cent.‡

Since the appearance of the British Pharmacopœia, I have again procured samples of spirits of nitre from several of our leading manufacturers, but in no case have I yet found sufficient nitrous ether present to yield any indication by the test. In fact, it has been admitted that a salt containing 25 per cent. of real nitrite is the best product that has been obtained by the process of deflagration.

Apothecaries' Hall, Blackfriars, June, 1865.

NOTES ON IODIDE OF POTASSIUM, ETC.

BY MR. WILLIAM HUSKISSON, JUN.

The 'Pharmaceutical Journal' for October last contains an interesting report by Mr. Clayton, in which he forms a comparison, based upon quantitative and qualitative analysis, between the relative values of English and Foreign Iodide of Potassium. The impurities in the commercial English iodide may be fairly considered as accidental. The chloride of potassium is derived from the American pearlashes employed in the process which, as is known, is never free from chloride, and the removal of traces of this salt is often attended with much difficulty, so much so, indeed, that even highly bicarbonated potash recrystallized often contains traces of it. I suggested a process some time since for getting iodide of potassium free from chloride by decomposing sulphate of potash with iodide of calcium. With reference to the moisture it will be observed that cubic iodide of potassium nearly always contains free alkali, which secretes itself between the interstices or plates or in the cells that form the cubes

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* $NaO,NO_3 : \overline{EO},NO_3$ by Weight. by Vol.
$69 : 75 :: 5 : \frac{5{\cdot}435}{{\cdot}900} =$ 6·04 in 35 of spirit of nitrous ether = 17·25 per cent. Nitrous Ether.

† Thus:—17·25 : 100 :: 13 : 75·34; or, 100 : 13 :: 35 : $\overset{\text{Vol.}}{4{\cdot}55} \times {\cdot}900 = \overset{\text{Wt.}}{4{\cdot}095}$. Then, 75 : 69 :: 4·095 : 3·767 × 20 = 75·34.

‡ $\left.\begin{matrix}\text{And}\\ \text{B. P.}\end{matrix}\right\} \frac{9{\cdot}5 \times 100}{17{\cdot}25} = 55{\cdot}07.$

or crystals, and does not entirely separate when the salt is left to drain for a considerable length of time. A temperature of 212° also fails to abstract this moisture. On a large scale the crystals are submitted to a temperature of upwards of 300° for many hours. After this application, if they are reduced to powder and submitted to a still higher temperature, they do not lose weight, but if the heat be gradually increased to the fusing-point, a loss is at once perceptible, and the salt indicates the presence of iodate of potash. If these crystals are kept for a length of time or exposed to the air, the deliquescent alkali contained in the interstices will attract sufficient moisture to account for the percentage estimated in Mr. Clayton's analysis *in most instances.* When much care is bestowed upon the preparation of this salt the crystals possess great beauty, occurring in opaque or ivory-white cubes or blocks, sometimes in flat plates or slabs, weighing from a few grains to several ounces each. The opacity, transparency, and size of the crystal are entirely in the hands of the manufacturer; but under any circumstances the crystals are never perfect, one or more of the faces or sides of the cube being always imperfect. After operating upon large quantities with unremitting care and adopting every contrivance, I never succeeded in producing a perfect cube. If the imperfect side of one of these cubes be placed upwards in a glass tube, and heat applied, the form of the crystal can be preserved and the moisture, if required, estimated (*this side being composed of the edges of the plates between which the steam can escape*); but if, on the other hand, the imperfect face of the cube be placed downwards and weighted on a platina or porcelain dish, on the very careful application of heat the cube will be shattered or cleaved into thin plates or small cubes, it is therefore evident if these crystals were not porous or one or more of the faces imperfect, the salt could not be rendered anhydrous without the crystals or cubes being shattered to pieces. The fineness and beauty of the shell that surrounds the sides of the cube will not allow the steam formed to escape on the application of heat. If one of the plates separated by heat or cleavage be examined under the microscope, a saline body will be observed to be dried on the ivory surface. If this surface be moistened with a slight breath of steam, upon the application of turmeric paper, a brown impression will be left upon the paper, and the whole of the alkali may be thus removed from both surfaces, and the thin plate or beeswing left will be found to be neutral, although if the crystals be dissolved in water they will scarcely give an alkaline reaction.

The entire absence of bromine in all the samples of iodide examined by Mr. Clayton seems remarkable, as we find bromine associated with iodine in much of the fucus and ulva used in the manufacture of kelp; and as British manufacturers do not collect or separate the bromine, the question arises, what becomes of it?

I had occasion to remark some time ago, that when testing bromide of potassium for the detection of iodide, starch failed readily to indicate iodine in an alkaline solution. This fact has been long since known with regard to ozone. To be perfectly sensitive to the influence of ozone the cubic iodide requires to be exactly neutralized with hydriodic acid.* From a neutral solution the salt then crystallizes in nearly transparent or pale-yellow octohedrons, with rhombic bases, or similar in geometrical form to iodine when crystallized from an alcoholic solution or separated by sublimation. I drew attention to the value of this neutral iodide some years ago in photography, and it has since become a commercial article amongst photographers. With regard to the iodate often contained in some of the French or foreign iodide, I believe it to be partly due to the processes they adopt differing from those of the manufacturers of this country.

* The foreign iodide does not answer for this purpose, as it often contains iodate of potash.

Hitherto the French have been enabled to produce iodine at a less cost than the English manufacturer, arising principally from the great value of chloride of potassium in France, the chloride being a secondary product in the manufacture of iodine. Recently, however, the Emperor of the French has taken the duty off chloride of potassium, and this, together with the late discovery of an island the superstratum of which is entirely composed of almost pure chloride of potassium, while the strata below consist of chloride of sodium, etc., will seriously affect the value of the chloride of potassium produced in the manufacture of iodine. Under these circumstances it is generally believed that this important branch of industry will be to some extent transferred to this country. Iodine for many years past has been a favourite article with wealthy speculators for the investment of large capital, and it has ranged from 3½*d.* to 2*s.* 8*d.* per ounce in a few months. About two years since it fell to 3½*d.* per ounce, which was supposed to be owing to the ingenious and economical process of Mr. Stanford. By the old process one ton of seaweed would only yield from eight to fourteen *pounds of iodine.*

Formerly commercial iodine contained a large percentage of moisture, and on keeping the iodine for twelve months this loss sometimes amounted to 10 lb. in a cwt., a great deal of which was absorbed by the staves of the casks or passed through them and was lost. The moisture is generally estimated by pressing the iodine between folds of blotting-paper, and the appearance of the paper indicates the amount of moisture present. Iodine sometimes contains iodide of cyanogen, which rises in fine white needles when the iodine is heated. This is an accidental impurity produced by one of the processes sometimes adopted in the manufacture. Iodine has been adulterated to some extent with manganese, alumina, sand, etc., although this is not of frequent occurrence. A quantity of iodine purchased some weeks since was found, on examination, to contain in each keg of 100 lb. 2 lb. of a substance or adulteration which was proved to be furnace drift or the substance found in the flues of steam-boilers. This claim was not allowed by the seller, owing to the iodine having been approved on inspection without testing. This may be of some value to buyers of iodine. The facility and perfection by which the salts of iodine are produced, their rich and varied colours, and striking geometrical form, render them of more than ordinary interest to the chemist; as a few illustrations of this may be mentioned, sublimed iodide of arsenic,* so closely resembling the leaf of the seaweed, the rich sable plumes of iodide of sulphur,† biniodide of mercury, and the truncated crystals of iodide of ammonium.

POISONING WITH SULPHATES OF ZINC AND IRON.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Can the sulphates of zinc and iron be resorted to to effect slow-poisoning? I have been induced to ask myself this question from the chemical examination of a case at Malmesbury. From the evidence given at the inquest, it appeared that Dr. Salter was called in to the wife of a horse-doctor, on the 12th April last, and continued so until the 23rd, for uterine hæmorrhage and vomiting. The former complaint was soon cured, but the latter continued so obstinately and followed so constantly her husband's supplies of food and drink, that on that day, on her coming downstairs, she vomited in Dr. Salter's presence, and he

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* When sublimed in vessels containing air the sublimate will be interspersed with crystalline tufts of arsenious acid.

† This sublimate only contains 3 per cent. of sulphur, according to Rose.

then secured it, and on the 25th, when he saw Lait and his wife together, he felt it his duty to tell her, in the husband's presence, that her illness was not from disease but from poison; that if she remained there she would die, and he would not sign a certificate; but if she removed she might be cured. It subsequently appeared that on that day Lait called in Dr. Jeston, but on the 29th Lait called at Dr. Salter's surgery and said the sickness was just as bad; he was given powders of oxalate of cerium; on the 7th a message was left at Dr. Salter's surgery to say that Mrs. Lait was dead. The two surgeons consulted together, and the result was that they both refused a certificate. An inquest was held, and a post mortem and analysis ordered. The matters were sent me by the Coroner, and on examination I found the stomach greatly inflamed, particularly in the cardiac portion, the mucous surface raised by air blisters, the intestines were only moderately acted on. In the vomit secured by Dr. Salter, I found traces of sulphates of zinc and iron, so I did in the lower intestines, but in the food contained in the stomach and duodenum there was only sulphate of iron. The most suspicious part of this case lies in the fact that the woman was always sick after food or drink from her husband, and not otherwise, and she had always complained of a coppery taste in the mouth. The verdict returned by the jury was to the effect, but not in the exact words,—Died from taking sulphate of zinc, a deadly poison, but by whom given is to the jurors unknown.

WILLIAM HERAPATH, SEN., F.C.S., ETC.,
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ON MAGNESIUM.

The existence of magnesium was revealed by Sir Humphry Davy. By means of large electric batteries at the Royal Institution, Albemarle Street, London, he succeeded in decomposing sundry earths and alkalies, and demonstrated their metallic bases. Thereby he opened a new continent to scientific exploration—a continent as yet virgin in many regions, as America or Australia.

Magnesium dates from Davy, in 1808, but for half a century it stood for little but a name in the catalogue of elements. In combination with oxygen, as the medicine magnesia, it was familiar to everybody, but as a metal it has been a very great rarity, preserved in bottles and sold in grains at fancy prices, and even then but seldom pure. Indeed, in several manuals of chemistry it is so incorrectly described, that it is evident the authors have never seen the metal in simplicity.

It would appear that Davy did little more than indicate the existence of magnesium. His discoveries were too numerous for him to track out each in detail, and twenty years elapsed ere any one was tempted to resume the study of magnesium from the point where he left it. In 1827, Wheeler having obtained aluminium by the decomposition of the chloride of aluminium by potassium, it occurred to Alexander Bussy, the Parisian chemist, that it would be possible to divorce magnesium from its combination with chlorine in the same way. He tried and succeeded. He fused some globules of potassium in a glass tube with anhydrous chloride of magnesium, and to his delight obtained globules of the metal. In 1830 he made the process the subject of a memoir addressed to the Royal Academy of Sciences.* Bussy is sometimes credited with the discovery of magnesium, but though that honour is unquestionably Davy's, he was certainly the first to exhibit it in anything beyond microscopic quantities and to describe its properties.

With Bussy, progress ceased for another series of years. Becquerel, by electrolysis, from a solution of the chloride of magnesium procured the metal in minute octahedral crystals. Bunsen, likewise by electrolysis, obtained the metal, and further modified Bussy's process by adding chloride of sodium or of potassium to the anhydrous chloride of magnesium. Matthiessen, in turn, tried to improve upon Bunsen by adding chloride of

* 'Journal de Chimie Médicale,' March, 1830, and 'Annales de Chimie et de Physique,' vol. xlvi. page 434.

ammonium, also reducing the compound by electrolysis. He afterwards succeeded in pressing some grains of magnesium into wire.

It was reserved, however, for Deville and Caron to make the first grand advance on the labours of Bussy. They, about 1856, effected the reduction of the chloride of magnesium by sodium in clay crucibles, using the fluoride of calcium as a flux, and so obtained magnesium in larger quantities than any of their predecessors. But their chief discovery was the volatility of the metal; they distilled a few grammes at a time in a gas carbon retort tube enclosed in a porcelain tube.*

So far magnesium had been produced on a laboratory scale; none of the methods made any pretence to commercial application. In 1859, M. Bunsen, of Heidelberg, and Professor Roscoe, of Manchester, after a variety of experiments, published their opinion of the high value of magnesium as a source of light for photographic purposes, owing to the close affinity of its chemical properties to those of sunlight, and offered at the same time some excellent suggestions as to the mode of its combustion—suggestions which have since been wrought into practice.

The memoir of Bunsen and Roscoe was read by Mr. Edward Sonstadt,—a young Englishman with a name derived from Swedish ancestry,—and it set him thinking whether it would not be possible to make magnesium cheap enough for at least some practical purposes. The ore was abundant. Surely some means might be devised for releasing the silvery treasure from the elements which held it in obscurity and idleness!

The question started, was quickly attacked with vigour, pertinacity, and ingenuity. For many months, day after day, far into the night, and often until the dawning of the morning, did Sonstadt, without cessation, first in Nottingham and subsequently at Loughborough, strive, through multitudinous and costly experiments, to compass his end. In November, 1862, he had so far succeeded, that he felt warranted in taking out his first patent for "Improvements in the Manufacture of the Metal Magnesium." His success was at the same time attested by the circulation amongst his acquaintances of specimens of the new metal, from the size of a pin's head to that of a hen's egg.

The metal in this state burnt freely enough, but it contained slight impurities, and demanded further treatment to render it ductile and malleable. Again Sonstadt set to work, and after another arduous series of experiments, devised a process of purification by distillation, which he secured by patent in May, 1863. One of the first lumps of the distilled metal was presented to Professor Faraday at the Royal Institution,—the spot where magnesium was first introduced to human knowledge. "This is indeed a triumph!" exclaimed the great philosopher, as he poised the shining mass in his hand.

Not yet, however, had the time arrived for working magnesium on a commercial scale. Many details had to be brought still nearer practical perfection, and the summer and autumn of 1863 were consumed in experiments. At last, with the close of the year, Mr. Sonstadt considered it safe to commence manufacturing. The Magnesium Metal Company was organized, and operations commenced in Manchester.

The aim with which Mr. Sonstadt set out was, a ready method for the extraction of magnesium from its ore, and his merit is to be measured by its achievement. The methods of his predecessors were only practicable in the laboratory—indeed, they made no pretence to practise elsewhere; they required complicated apparatus and delicate manipulation, and, with all care, frequently resulted in failure. His method, on the contrary, is so simple, that it can be accomplished by the hands of ordinary workmen, and on a scale only limited by the convenient size of vessels and furnaces. At Loughborough, at Midsummer, 1863, we saw some pounds of magnesium made by a labourer and his boy with perfect ease.

The manufacture of magnesium, as conducted in Manchester, may be conveniently described under three heads:—I. The preparation of anhydrous chloride of magnesium. II. The release of the magnesium from the chlorine. III. The purification of the magnesium by distillation.

I. Lumps of rock-magnesia (carbonate of magnesia) are placed in large jars and saturated with hydrochloric acid. Chemical action at once ensues; the union of carbon and oxygen with magnesium in the rock is dissolved; the magnesium combines with

* MM. Deville and Caron's labours are described with that exquisite clearness which is peculiarly French, in the 'Comptes Rendus' of the 27th February, 1857, page 394, and with enlarged experience in the 'Annales de Chimie et de Physique,' 1863, vol. lxvii. page 347.

the chlorine of the acid, forming the desired product—chloride of magnesium, but in solution.

The water is next evaporated from the salt. The liquor is poured into broad open pans, which are placed over stoves. When the drying is sufficiently advanced, the salt is collected into a crucible and subjected to heat until perfectly melted and the last traces of water driven off, when it is stowed away in air-tight vessels.

II. In the second stage, that curious metal, sodium, used likewise in the reduction of aluminium, comes into play. Common table salt is sodium *plus* chlorine; released from chlorine we have sodium. It is a white metal, but quickly grows dim on exposure to the moisture of the atmosphere. If cast upon water it floats and burns fiercely, almost like potassium. Such is its affinity for oxygen, that it has to be kept in air-tight vessels or under oil. It may be cut with a knife, somewhat like tough cheese.

In a crucible are deposited five parts of the dry chloride of magnesium, with one part of sodium. The crucible is covered and heated to redness, when the chlorine deserts the magnesium and flies over to the sodium. The crucible is allowed to cool, and its contents removed in block, which, when broken up, reveals magnesium in nuggets of various sizes and shapes, like eggs, nuts, buttons, and in minute granules. This product is styled crude magnesium.

III. The distillation of the crude magnesium is effected in a crucible through which a tube ascends to within an inch of the lid. The tube opens at the bottom into an iron box placed beneath the bars of the furnace, so that it may be kept cool. The crucible is filled with the crude metal to the level of the mouth of the tube, the lid is carefully luted down, and the atmospheric air expelled by the injection of hydrogen. As the crucible becomes heated, the magnesium rises in vapour freed from any impurities, and descends through the upright tube in the centre into the box below, where, on the completion of the operation, it is found in the form of a mountain of drippings. It is subsequently melted, and cast into ingots, or into any other form that may be desired.

In this broad sketch of the process of manufacture, the reader will perceive how fully Mr. Sonstadt's ideal has been realized. Scarcely a month elapses in which some detail is not reduced to greater simplicity, and some new economy discovered in the works of the Magnesium Metal Company. The new art has made great progress since its establishment; experience suggests constant improvements: as the old copy-head runs—Practice makes perfect.

When the Magnesium Company commenced manufacturing, the question presented itself, In what form should the metal be offered to the public? As there was no known use for it except as a light, it was determined to vend it in the form of wire; but here arose a difficulty—How to make wire. The metal was not ductile, and could not, like iron or copper, be drawn out. Dr. Matthiessen and others had pressed small quantities into wire, but when experiments were made on a large scale, the magnesium was found capricious; sometimes it worked readily, but at others it resisted enormous pressure, and the rams broke down under the strain. Mr. William Mather, of Salford, had taken the matter in hand, and with admirable resolution declined to be baffled; through costly disasters he persevered, tried, and tried again, and finally overcame. Now, by machinery of his contrivance, the metal is pressed into wire of various thickness, and a spectator might wonder, as the silver threads stream forth, how that which now seems so easy should have cost such pains. Mr. Mather improved on the wire by flattening it into ribbons, in which form, as a larger surface is exposed to the air, combustion takes place more completely. Mr. Mather likewise made the first lamp for burning magnesium. In it the end of the wire or ribbon was presented to the flame of a spirit-lamp, to ensure perfect combustion. As the wire burnt, it was paid out by hand from a reel, and propelled between rollers through a tube, which conducted it to the flame. A concave reflector diffused the light forwards, and afforded shade to the eyes of the operator.

To few could the introduction of the new metal to commerce yield such lively satisfaction as Professor Roscoe, whose hint had been, as it were, the spark which set Mr. Sonstadt's energy afire. It was Dr. Roscoe's lot, moreover, to introduce magnesium to the scientific public. In doing so, he was fortunate in having the assistance of Mr. Brothers, of Manchester, who, in the spring of 1864, was the first to take a photograph by the magnesium light. At the Royal Institution in May, last year, Professor Roscoe delivered a lecture on light, and among his illustrative experiments, burned some magnesium, and calling forth Professor Faraday from the audience, had him photographed on the spot by Mr. Brothers, and the negative being inserted in the magic lantern a gigantic likeness of the venerable *savant* was projected on the screen. The same experiment was repeated, with Sir Charles Lyell for a subject, in the Bath Theatre, when Professor Roscoe lectured on light to one of the evening assemblies of the British Association.

To photographers the magnesium light will prove an inestimable advantage. Smoke, fog, and night need no longer interfere with their operations. A busy man, who cannot afford to lose a forenoon in order to catch the sunshine, may have his likeness taken in the quiet and leisure of an evening at home. Photographs under such circumstances are much more likely to possess that ease and naturalness, which are so difficult to attain under the ordinary conditions of out-of-door costume, an ascent to a house-top by a tedious flight of stairs, and a pose in the glare of a glass-house amid theatrical furniture. As a Quarterly Reviewer observes:—

"The new magnesium light promises to dispense with the necessity of a glass studio with all its discomfort for the sitter, and all the temptation to meretricious decoration which it appears to hold out to the photographer. The metal magnesium, the oxide and carbonate of which is a familiar medicine, is itself rare. It will burn like a candle,* and it emits a light peculiar for its wonderful richness in chemical rays; but until recently the cost of isolating it has been so great, that its capabilities have never advanced beyond the rank of a chemical curiosity. Recent discoveries have, however, facilitated its manufacture, and it has come into partial use among photographers. A negative of Sir Charles Lyell was taken at the recent meeting of the British Association. A slight further reduction in cost [a reduction which has been made since this was written] will enable photographers to use it for the purpose of taking likenesses in the houses of their sitters; and the sitter's gain in personal comfort will be duly registered in the improved expression of the picture."†

Nor are portraits taken by magnesium light in any sense makeshifts. It is quite within the truth to say, that they are equal to, and undistinguishable from sun-pictures. Of course the skilful handling of the new light is only to be acquired after some practice.

The light will probably develope a melancholy branch of art—the portraiture of the dead. We say melancholy, but more in a conventional than a sincere sense. The faces of the dead frequently assume a sweet, a saintly, a severe, a statuesque beauty rarely present in life. By the aid of magnesium, this beauty may readily be perpetuated and divested of painful accessories. Some such memorials we have seen, and they have only to be known to become common.

As soon as it was discovered that photography was possible by magnesium, it was suggested that the interiors of the Pyramids, of catacombs, caves, and other underground and dim regions might be revealed in faithful pictures, and studied under the stereoscope. The suggestion was soon acted upon. Professor Piazzi Smyth, the Scottish Astronomer-Royal, having gone upon an exploring expedition to the Pyramids, took with him a quantity of magnesium wire, and thus reports on its use to his friend Mr. Spiller, of Woolwich Arsenal:—

"*East Tomb, Great Pyramid, Feb.* 2, 1865.

"MY DEAR SIR,—We have been here now about three weeks, and are settled down at last to the measuring; the chief part of the time hitherto having been occupied, in concert with a party of labourers furnished by the Egyptian Government, in clearing away rubbish from important parts of the interior, and in cleansing and preparing it for nice observation.

"The magnesium-wire light is something astounding in its power of illuminating difficult places. With any number of wax candles which we have yet taken into either the kings' chamber or the grand gallery, the impression left on the mind is merely seeing the candles and whatever is very close to them, so that you have small idea whether you are in a palace or a cottage; but burn a triple strand of magnesium wire, and in a moment you see the whole apartment, and appreciate the grandeur of its size and the beauty of its proportions. This effect, so admirably complete, too, as it is, and perfect in its way, pro-

* No, not quite like a candle. Magnesium wire should be held downwards, say at an angle of 45°, in burning. No more than a paper spill or a wood match will magnesium burn with certainty if the lighted end be held upright.

† Article "Photography" in the 'Quarterly Review' for October 1864, page 517.

bably results from the extraordinary intensity of the light, apart from its useful photographic property, for, side by side with the magnesium light, the wax candle-flame looked not much brighter than the red granite of the walls of the room. There come parties—often many parties—of visitors to see the Pyramid every day without fail, and they come amply provided, too, with all sorts of means and appliances to enjoy the sight, *i. e.* with everything but the needful magnesium wire; and one waistcoat-pocket of that would be worth a whole donkey-load of what they do bring up to enable their souls to realize the ancient glories of the internal scene.

"I remain, yours very truly,

"John Spiller, Esq., Chemical Department, C. Piazzi Smyth.
Royal Arsenal, Woolwich."

M. Nadar is said to be engaged on a series of photographs of the Catacombs of Paris; various artists are busy practising on monuments in obscure recesses of Continental churches; and Mr. Brothers, we believe, contemplates undertaking the caves of Derbyshire. The crypt of St. Stephen's Palace of Westminster, recently restored and decorated under the direction of Mr. E. M. Barry, has been lighted up for an hour and a half with the magnesium lamp, and the exquisite elaboration of its moulded and carved doorways and the bosses of the groining displayed in vivid detail. By the same means the vast recesses of the Outfall Sewer Works at Crossness have been illuminated.

In surgery, the magnesium light is now freely used in examinations with the speculum. In a recent number of 'Galignani' we read:—

"This powerful light has just received a new application in connection with the laryngoscope, a small apparatus consisting of two mirrors by means of which the lower parts of the larynx may be conveniently brought to view. M. Maisonneuve, being desirous of showing his students the manner of using this apparatus, requested Dr. Fournié, the inventor of the improvement we are about to describe, to attend a late clinical lecture of his. Dr. Fournié did so, bringing a patient with him who was suffering from a polypus situated deep in the throat. This tumour, of the size of a filbert, not only impeded the free articulation of sound, but might in the end, by its growth, have rendered respiration impossible, and consequently caused death by suffocation. In order to render this pathological phenomenon visible to the students and physicians who crowded the lecture-room, M. Fournié made use of the magnesium light. By means of M. Mathieu-Plessy's lamp, especially constructed for the magnesium light, strong luminous rays were projected on the mirror placed at the furthest end of the fauces, and thence reflected into the larynx and the trachea. These parts being thus powerfully illuminated, were visibly depicted on the mirror; but the image was necessarily small, the mirror not being more than two centimetres square. But on a bi-convex lens being placed before the patient's mouth, the image became so enlarged, that every one could distinguish it from a distance of a few metres. These two applications of important scientific discoveries and contrivances combined are highly interesting; in the first place, by the aid of the magnesium light, the exact site of the slightest sore in the upper respiratory organs may be discovered by physicians; and in the second place, the same may be rendered visible to a numerous audience."

One of the peculiarities of the magnesium light is, that it displays colour as in sunshine. This may be tested, and a very interesting effect produced, by burning some wire in a garden or conservatory at night. This peculiarity we learn, from the 'British Journal of Photography,' is being turned to practical account:—

"The magnesium lamp promises quickly to become a regular article of furniture in every silk-mercer's show-room. A dyer, of Paris, some months ago, saw the magnesium light for the first time, and discovering at once that its rays left colours unaffected, exclaimed, 'This is just what we have long wanted.' Even in Paris there are many days in winter when those who deal with delicate shades of colour are utterly at a loss to discriminate between tint and tint, but the magnesium light has completely removed the difficulty. Now, whether it be foggy or night, any question as to colour is in a moment set at rest in the flame of a bit of magnesium wire."

The strength of the magnesium light, coupled with its easy production, qualifies it for extensive employment in commerce and war. Unlike the electric and oxy-hydrogen lights, it involves no cumbrous and troublesome apparatus. With a coil of the wire in his waistcoat pocket and a few matches, an Alpine explorer has instant means for making his whereabouts known at night. The light has been seen at a distance of twenty-eight miles at sea; how much further remains to be determined. Commissions under several Governments are investigating its capabilities, and there is reason to believe that it will very soon be adopted for ship signals and lighthouses. It has been suggested that rockets primed with magnesium in powder and thrown up at uncertain intervals would effectually prevent a night surprise, as they would light up the country for miles around. By the same means many of the secrets of an enemy's works and position might be discovered. Had the United States' Navy possessed the light sooner, the hazards of blockade-running would have been indefinitely increased. Its merits were only revealed when the opportunities for its employment were passing away. We read in the 'Times,' of 20th February of the present year:—

"It appears that, according to Federal anticipations, blockade-running is likely to suffer a check by the introduction into the American Navy of the new magnesium light, of which metal the Washington Government has ordered a supply. Several of the European Governments, it is also said, are engaged in experiments with a view to its adaptation to lighthouses and coast and sea signals."

An American Magnesium Company has been formed to work Sonstadt's patents in Boston; and it will be singular if that enterprise, ingenuity, and fertility of resource, which have placed the name of New England in the highest rank in the arts alike of peace and war, do not quickly surprise us with some bold applications of the metal.

It is hardly necessary to describe magnesium. In wire or ribbon it has become a common object in shop windows. It is white—brilliant as silver when pure and clean. In dry air it preserves its lustre, but in moisture it oxidizes and gets dull as zinc. Its specific gravity is 1·75, or about one-fifth that of copper, which is 8·96. Aluminium is a very light metal, but its specific gravity is 2·56—much denser than magnesium. Silver 10·50; an ounce of magnesium is therefore six times the bulk of an ounce of silver.

We have confined ourselves to the uses of magnesium as a light-giver. That use has been so obvious, and pregnant with so many advantages, that it has absorbed all attention; but it is scarcely probable that magnesium will continue to be made for burning only. It has surely other merits; but much, very much, remains to be learnt about it. What is its value as a conductor of electricity? Under what conditions is it ductile?—under what fragile? What is the degree of its tenacity—its strength under tension? What is its specific heat? What are the characters of its alloys? These and scores of other questions have yet to be answered with scientific precision.

People are constantly drawing conclusions from the present price of magnesium. Reasoners were last summer deciding that this and that could never be done, because it was selling in wire at 3*d.* per foot. Now that it is selling at 1*d.*, where are their conclusions? Arguments from such premises are idle. No one can tell at what price magnesium may be produced. Many improvements in the processes of production have been effected since the Magnesium Company commenced working, and their experience will beget others; their art is young—not yet two years old. Price, moreover, is largely dependent on the scale of production. If iron was worked on the present scale of magnesium, at what price would iron wire be retailed per foot? Whenever magnesium is demanded in large quantities, its price will fall. The Magnesium Company look wistfully for great consumers, for various economies at their command are only practicable on extensive plans. They could, and they desire earnestly, to produce cheaply; they only await opportunity. Dr. Percy informs us, that no one need think of smelting copper with less capital than £50,000; the requisite economies are impossible on smaller means. Should magnesium ever be used as freely as copper, who can predict what may be its price?—*Technologist.*

ON COMBUSTION BY INVISIBLE RAYS.

PROFESSOR TYNDALL, F.R.S., M.R.I.

Delivered at the Royal Institution of, Great Britain, Friday, January 20, 1865.

We are so accustomed to associate the word *ray* with the idea of light, that the term dark, or invisible, or obscure rays, stimulates the imagination by its strangeness; and such is more particularly the case when we are told that the major portion of the radiation of the sun itself is of this invisible character. This great discovery was announced sixty-five years ago by Sir William Herschel. Permitting a sunbeam to pass through a glass prism, he formed the coloured spectrum of the solar light; and, carrying a small thermometer through its various colours, he determined their heating power. He found this power to augment gradually from the violet to the red; but he also found that the calorific action did not terminate where the visible spectrum ended. Placing his thermometer in the dark space beyond the red, he proved the heating power there to be greater than in any part of the visible spectrum.

Sir William Herschel concluded from his experiments, that besides those rays which, acting separately upon the retina, produce the sensation of colour, and the sum of which constitutes our ordinary sunshine, a vast outflow of perfectly invisible rays proceeds from the sun, and that, measured by their heating power, the strength or energy of these invisible rays is greater than that of all the visible rays taken together.

This result was questioned by some and confirmed by others; but, like every natural truth that can be brought to the test of experiment, the verity of Sir William Herschel's announcement was soon completely established. Forty years after the discovery of those invisible rays by his father, Sir John Herschel made them the subject of experiment. He made an arrangement which enabled him to estimate the heating power of the spectrum by its *drying* power. Wetting by a wash of alcohol, paper blackened on one side, he cast his spectrum on this paper, and observed the chasing away of the moisture by the heat of the rays. His drying paper presented to him a *thermograph* of the spectrum, and showed the heating power to extend far beyond the red.

By the introduction of the thermo-electric pile, Melloni created a new epoch in researches on radiant heat. This instrument enables us to examine, with a precision unattainable with ordinary thermometers, the distribution of heat in the solar spectrum. Melloni himself devoted some time to this subject. He had made the discovery that various substances, in the highest degree transparent to light, were eminently opaque to those invisible heat-rays. Pure water, for example, is a body of this kind. Only one substance did Melloni find to be equally pervious to the visible and the invisible rays—namely, transparent rock-salt. And though the researches of MM. De la Provostaye and Desains, together with some extremely suggestive experiments executed by Mr. Balfour Stewart, show conclusively that Melloni erred in supposing rock-salt to be *perfectly* transparent, it must be admitted that, in this respect, the substance approaches very near perfection.

Abandoning prisms of glass, which had been always employed previously, Melloni made use of a prism of rock-salt in his experiments on the solar spectrum. He was thus enabled to prove that the ultra-red rays discovered by Sir William Herschel formed an invisible spectrum, at least as long as the visible one. He also found the position of maximum radiant power to lie as far on one side the red as the green light of the spectrum on the other.

Dr. Franz, of Berlin, subsequently examined the distribution of heat in the solar spectrum, employing for this purpose a flint-glass prism. He showed that the inaction of the ultra-red rays upon the retina did not altogether arise from the absorption of those rays in the humours of the eye; at all events, he proved that a sensible portion of the invisible rays was transmitted across the eye-ball of an ox, and reached the back of the eye. Professor Müller, of Freiberg, afterwards examined very fully the heat of the solar spectrum; and representing, as Sir William Herschel also had approximately done, by lines of various lengths the thermal intensity at various points, he drew a curve which expressed the calorific action of the entire spectrum.

At various intervals during the last ten years the speaker had occupied himself with the invisible radiation of the electric light; and to the distribution of heat in its spectrum he now directed attention. The instruments made use of were the electric lamp of Duboscq and the linear thermo-electric pile of Melloni. The spectrum was formed by means of lenses and prisms of pure rock-salt. It was equal in width to the length of the row of elements forming the pile, and the latter being caused to pass through its various colours in succession, and also to search the space right and left of the visible spectrum, the heat falling upon it, at every point of its march, was determined by the deflection of an extremely sensitive galvanometer.

As in the case of the solar spectrum, the heat was found to augment from the violet to the red, while in the dark space beyond the red it rose to a maximum. The position of the maximum was about as distant from the extreme red in the one direction, as the green of the spectrum in the opposite one.

The augmentation of temperature beyond the red in the spectrum of the electric light is sudden and enormous. Representing the thermal intensities by lines of proportional lengths, and erecting these lines as perpendiculars at the places to which they correspond, when we pass beyond the red these perpendiculars suddenly and greatly increase in length, reach a maximum, and then fall somewhat more suddenly on the opposite side of the maximum. When the ends of the perpendiculars are united, the curve beyond the red, representing the obscure radiation, rises in a steep and massive peak, which quite dwarfs by its magnitude the radiation of the luminous portion of the spectrum.

Interposing suitable substances in the path of the beam, this peak may be in part cut away. Water, in certain thicknesses, does this very effectually. The vapour of water would do the same; and this fact enables us to account for the difference between the distribution of heat in the solar and in the electric spectrum. The comparative height and steepness of the ultra-red peak, in the case of the electric light, are much greater than in the case of the sun, as shown by the diagram of Professor Müller. No doubt the reason is, that the eminence corresponding to the position of maximum heat in the solar spectrum has been cut down by the aqueous vapour of our atmosphere. Could a solar spectrum be produced beyond the limits of the atmosphere, it would probably show as steep a mountain of invisible rays as that exhibited by the electric light, which is practically uninfluenced by atmospheric absorption.

Having thus demonstrated that a powerful flux of dark rays accompanies the bright ones of the electric light, the question arises, "Can we not detach the former, and experiment on them alone?"

One way of doing this would be to cut off the luminous portion of the decomposed beam by an opaque screen, allowing the non-luminous portion to pass by its edge. We might then operate at pleasure upon the latter:—reflect it, refract it, concentrate it. This, in fact, was done by Sir William Herschel, but a quantity of heat could not thus be obtained sufficient to produce the results intended to be exhibited before the conclusion of the discourse. Another plan consists in permitting the total radiation to pass through some substance transparent to the heat rays, but opaque to the light rays. Melloni discovered that lampblack, and also a kind of black glass, while perfectly opaque to light, transmitted a considerable quantity of radiant heat. In the 'Lectures on Heat,' given at the Royal Institution in 1862, and since made public, experiments with these bodies are described. It was while conversing with his friend Mr. Warren De la Rue, in the autumn of 1861, on the possibility of sifting, by absorbents, the light of a beam from its heat, that the speaker first learned that carbon was the substance which rendered Melloni's glass opaque. This fact was of peculiar interest to him, for it and others seemed to extend to solid bodies a law which he had detected two years previously in his experiments on gases and vapours, and which showed that *elementary* gases were highly transparent, while *compound* gases were all more or less opaque—many of them, indeed, almost perfectly opaque—to invisible radiant heat.

In the speaker's first experiments on the invisible radiation of the electric light, black glass was the substance made use of. The specimens, however, which he was able to obtain destroyed, along with the visible, a considerable portion of the invisible radiation.* But the discovery of the deportment of elementary gases directed his attention to other simple substances. He examined sulphur dissolved in bisulphide of carbon, and found it almost perfectly transparent to the invisible rays. He also examined the element bromine, and found that, notwithstanding its dark colour, it was eminently transparent to the ultra-red rays. Layers of this substance, for example, which entirely cut off all the light of a brilliant gas flame, transmitted its invisible radiant heat with freedom. Finally, he tried a solution of iodine in bisulphide of carbon, and arrived at the extraordinary result, that a quantity of dissolved iodine sufficiently opaque to cut off the light of the mid-day sun was, within the limits of experiment, absolutely transparent to invisible radiant heat.

This, then, is the substance by which the invisible rays of the electric light may be almost perfectly detached from the visible ones. Concentrating by a small glass mirror, silvered in front, the rays emitted by the carbon points of the electric lamp, we obtain a convergent cone of light. Interposing in the path of this concentrated beam, a cell

* The glass in thin layers had a greenish hue; I have since found black glass more diathermic.—J. T.

containing the opaque solution of iodine, the light of the cone is utterly destroyed, while its invisible rays are scarcely, if at all, meddled with. These converge to a focus, at which, though nothing can be seen even in the darkest room, the following series of effects may be produced:—

When a piece of black paper is placed in the focus, it is pierced by the invisible rays, as if a white-hot spear had been suddenly driven through it. The paper instantly blazes, without apparent contact with anything hot.

A piece of brown paper placed at the focus soon shows a red-hot, burning surface, extending over a considerable space of the paper, which finally bursts into flame.

The wood of a hat-box, similarly placed, is rapidly burnt through. A pile of wood and shavings, on which the focus falls, is quickly ignited, and thus a fire may be set burning by the invisible rays.

A cigar or a pipe is immediately lighted when placed at the focus of invisible rays.

Disks of charred paper placed at the focus are raised to brilliant incandescence; charcoal is also ignited there.

A piece of charcoal, suspended in a glass receiver full of oxygen, is set on fire at the focus, burning with the splendour exhibited by this substance in an atmosphere of oxygen. The invisible rays, though they have passed through the receiver, still retain sufficient power to render the charcoal within it red-hot.

A mixture of oxygen and hydrogen is exploded in the dark focus, through the ignition of its envelope.

A strip of blackened zinc-foil placed at the focus is pierced and inflamed by the invisible rays. By gradually drawing the strip through the focus, it may be kept blazing with its characteristic purple light for a considerable time. This experiment is particularly beautiful.

Magnesium wire, presented suitably to the focus, burns with almost intolerable brilliancy.

The effects thus far described are, in part, due to chemical action. The substances placed at the dark focus are oxidizable ones, which, when heated sufficiently, are attacked by the atmospheric oxygen, ordinary combustion being the result. But the experiments may be freed from this impurity. A thin plate of charcoal, placed *in vacuo*, is raised to incandescence at the focus of invisible rays. Chemical action is here entirely excluded. A thin plate of silver or copper, with its surface slightly tarnished by the sulphide of the metal, so as to diminish its reflective power, is raised to incandescence either *in vacuo* or in air. With sufficient battery-power and proper concentration, a plate of platinized platinum is rendered white-hot at the focus of invisible rays; and when the incandescent platinum is looked at through a prism, its light yields a complete and brilliant spectrum. In all these cases we have, in the first place, a perfectly invisible image of the coal points formed by the mirror; and no experiment hitherto made illustrates the identity of light and heat more forcibly than this one. When the plate of metal or of charcoal is placed at the focus, the invisible image raises it to incandescence, and thus prints itself visibly upon the plate. On drawing the coal points apart, or on causing them to approach each other, the thermograph of the points follows their motion. By cutting the plate of carbon along the boundary of the thermograph, we might obtain a second pair of coal points, of the same shape as the original ones, but turned upside down; and thus by the rays of the one pair of coal points, which are incompetent to excite vision, we may cause a second pair to emit all the rays of the spectrum.

The ultra-red radiation of the electric light is known to consist of ethereal undulations of greater length, and slower periods of recurrence, than those which excite vision. When, therefore, those long waves impinge upon a plate of platinum, and raise it to incandescence, their period of vibration is changed. The waves emitted by the platinum are shorter and of more rapid recurrence than those falling upon it; the refrangibility being thereby raised, and the invisible rays rendered visible. Thirteen years ago, Professor Stokes proved that by the agency of sulphate of quinine, and various other substances, the ultra-violet rays of the spectrum could be rendered visible. These invisible rays of high refrangibility, impinging upon a proper medium, cause the molecules of that medium to oscillate in slower periods than those of the incident waves. In this case, therefore, the invisible rays are rendered visible by the *lowering* of their refrangibility; while in the experiments of the speaker, the ultra-red rays are rendered visible by the *raising* of their refrangibility. To the phenomena brought to light by Professor

Stokes, the term *fluorescence* has been applied by their discoverer, and to the phenomena brought forward this evening at the Royal Institution, it was proposed to apply the term *calorescence*.

It was the discovery, more than three years ago, of a substance opaque to light, and almost perfectly transparent to radiant heat—a substance which cut the visible spectrum of the electric light sharply off at the extremity of the red, and left the ultra-red radiation almost untouched, that led the speaker to the foregoing results. They lay directly in the path of his investigation; and it was only the diversion of his attention to subjects of more immediate interest that prevented him from reaching, much earlier, the point which he has now attained. On this, however, he can found no claim; and the *idea* of rendering ultra-red rays visible, though arrived at independently, does not by right belong to him. The right to a scientific idea or discovery is secured by the act of publication; and, in virtue of such an act, priority of conception as regards the conversion of heat-rays into light-rays belongs indisputably to Dr. Akin. At the meeting of the British Association, assembled at Newcastle in 1863, he proposed three experiments by which he intended to solve this question. He afterwards became associated with an accomplished man of science, Mr. Griffith, of Oxford, and, jointly with him, pursued the inquiry. Two out of the three experiments proposed at Newcastle by Dr. Akin are impracticable. In the third, Dr. Akin proposed to converge the rays of the sun by a concave mirror, to cut off the light by "proper absorbents," and to bring platinum foil into the focus of invisible rays. It is quite possible, that, had he possessed the instrumental means at the speaker's disposal, or had he been sustained as the speaker had been both by the Royal Society and the Royal Institution, Dr. Akin might have been the first to effect the conversion of the dark heat-rays into luminous ones. For many years the idea of forming an intense focus of invisible rays had been perfectly clear before the speaker's mind; and in 1862 he published experiments upon the subject. The effects observed by him in 1862 at the focus of invisible rays were such as no previous experimenter had witnessed, and no experimenter could have observed them without being driven to the results which formed the subject of the evening's discourse. Still publication is the sole test of scientific priority; and it cannot be denied that Dr. Akin was the first to propose definitely to change the refrangibility of the ultra-red rays of the spectrum, by causing them to raise platinum foil to incandescence.

ON PYROXYLIN.

BY MM. PELOUZE AND MAUREY.

The attempts made during the last twenty years to substitute gun-cotton for ordinary powder for firearms and mines have resulted in most opposite conclusions. In France, after numerous experiments, it has been discarded on account of its detrimental effect on the metal of firearms, and accidents from spontaneous combustion and explosion, first brought into notice by a memoir presented by us to the Institute in 1849.

In Austria, General Lenk has continued to occupy himself with the manufacture and use of this explosive material. He prepares it by a process which has been followed on a large scale at Hirtenberg, and which remained for some years a profound secret. But during the last year papers on this subject have been published by German chemists and by General Lenk himself.

It would appear from these papers that the Hirtenberg pyroxylin does not decompose spontaneously, like that made in France at the Bouchet powder-factory, and moreover differs from the latter in its composition, and in the circumstance that its explosive power may be regulated by particular arrangements. We will now examine the value of these assertions, giving the results of some experiments and analyses we have made with the co-operation of MM. Faucher and Chapoteaut.

Processes followed at Hirtenberg and at Bouchet.—The pyroxylin made at Hirtenberg by General Lenk's process is, like the Bouchet pyroxylin, the product of the immersion of cotton in a mixture of monohydrated nitric acid and sulphuric acid at 66°. The two methods, however, differ in several respects.

Thus, the proportions of the two acids are not exactly the same, Lenk's mixture being composed of one part of nitric acid to three of sulphuric acid; that of Bouchet, under the name of unequal volumes, is prepared with one part of the first of these acids and two of the second, equivalent in weight to 1 per 2·46. The above-mentioned memoir gives, as being most successful, a mixture of three volumes of nitric acid and seven of sulphuric acid (by weight 1 to 2·86), proportions very nearly those given by General Lenk.

At Hirtenberg, the cotton is steeped in portions of 100 grammes in 30 kilogrammes of the mixture. It is withdrawn from the bath after being shaken in it for an instant, and each time the quantity of mixture absorbed by the cotton is replaced by a fresh amount. These operations are continued indefinitely, the weight of the mixture being always 300 times that of the cotton.

When the desired quantity of cotton has been steeped, it is put into a receiver, and allowed to remain forty-eight hours impregnated by the acids. It is then placed in a strainer, where most of the uncombined acids are expelled in a few minutes.

It is freed from the remainder in a stream of water in which it is washed, and where it remains immersed for six weeks, when it is strained a second time, boiled for two or three minutes in a solution of carbonate of potash of 2° Baumé. After a third and last straining, the cotton is dried in the air if the weather is favourable; if not, in a stove of which the temperature is not allowed to exceed 20° C.

General Lenk has latterly made use of a solution of soluble glass of 12° Baumé. The cotton prepared as above is soaked in it, dried, and exposed to the air for a sufficient time to allow the carbonic acid of the atmosphere to combine with the soda of the glass, which determines the precipitation of an insoluble silicate, which, according to General Lenk, "encloses the fibres of the cotton, and prevents the development of gases."

At Bouchet, the cotton is steeped in vessels containing only 2 litres of mixture for 200 grammes of cotton, and the steeping is considered complete at the end of an hour.

About 70 per cent. of non-combined acids are pressed out, the cotton being then washed for one or two hours in the river, freed from most of the water by strong pressure, and left for twenty-four hours in an alkaline ley to neutralize the last traces of acids. Withdrawn from this, it is a second time washed in the river, then pressed, and finally dried on a light canvas, through which a ventilator forces cold air.

Soluble glass has not been tried at Bouchet, but we are about to show that it is not so beneficial as it is supposed to be by General Lenk.

Quantity of Pyroxylin produced by a given quantity of Cellulose.—A German report, signed by MM. Redtenbacher, Schrötter, and Schneider, gives to Lenk's pyroxylin the formula:—

$$C_{12}H_7O_7,3NO_5 \text{ or } C_{12}H_7(NO_4)_3O_{10},$$

equivalent to the following composition:—

Carbon	24·24
Hydrogen	2·36
Oxygen	59·26
Nitrogen	14·14
	100·00

The reaction may be explained in two ways:—

1. By admitting that by contact with the mixture of nitric and sulphuric acids the cotton loses the water, which is replaced by the first of these acids—

$$C_{12}H_{10}O_{10} + 3NO_5 = C_{12}H_7O_7,3NO_5 + 3HO.$$

2. By supposing that the hydrogen of the cellulose is replaced by an equal number of equivalents of hyponitric acid—

$$C_{12}H_{10}O_{10} + 3NO_5 = C_{12}H_7(NO_4)_3O_{10} + 3HO.$$

According to this, 100 parts of cotton ought to produce 183 of pyroxylin; but though in more than 100 experiments we have varied the proportions of the bodies producing this explosive matter, 178 is the greatest yield we have been able to obtain.

The German report is silent on the subject of the yield, which, in our opinion, constitutes the most solid basis for determining the composition of pyroxylin. We do not say that the exact determination of the yield of cotton in pyroxylin renders useless the elementary analysis of the latter, but it is necessary that the analysis should agree with the figures representing this yield.

Our experiments on the yields have been made with cotton of good quality, previously washed in a boiling solution of carbonate of potash or soap, and then freed as much as possible from foreign bodies, particularly from cotton seeds. Before being used, it was carefully dried in a Gay-Lussac stove, between 100° and 115°.

The sulphuric acid marked 66° on the Baumé areometer. The nitric acid had a density of 1·500 at 9°; it was yellow and slightly nitrous.

The relative proportions of the sulphuric and nitric acids were varied so as to present, 1. The composition of Lenk's mixture; 2. That of the unequal volumes of Bouchet; 3. Various intermediary proportions between 2 and 3 of sulphuric acid for 1 of nitric acid.

The relative proportions of acid mixture and the weight of cotton were also varied, including those formerly used at Bouchet, and those indicated by General Lenk, until the weight of the acids was 500 times that of the cotton.

The duration of the immersion of the cotton in the acids varied from 1 to 66 hours.

In all these experiments the yields differed very little, never exceeding 178 per cent. of cotton.

The yield in manufactories whether at Hirtenberg or Bouchet is far from being so large as that obtained with small quantities in the laboratory. In fact, General Lenk says, that it requires 64·500 kils. of undried cotton to produce 100 kilogrammes of pyroxylin, which corresponds to a yield of 155. Supposing the cotton to contain 6 or 7 per cent. of moisture, the yield of dry cotton at Hirtenberg would have been from 165 to 167 per cent.

The yield at Bouchet, after the working had become regular, was 165·25 per cent.

Though unable to draw from these numbers any conclusion as to the theory of the formation of pyroxylin, we cannot pass over in silence a circumstance as important as the yield,—so to speak, identical with it,—obtained on a large scale in the two factories.

Composition of Pyroxylin.—In 1847 we determined the composition of pyroxylin, and represented it by the following formula—$C_{24}H_{17}O_{17},5NO_5$.

We must first find out whether we operated on a product different to Lenk's pyroxylin, and, if the two are chemically identical, whether this formula is correct.

We have conducted these researches with the greatest possible care, and believe we have surmounted the difficulties of the combustion of pyroxylin. We found the pyroxylin of Hirtenberg and Bouchet chemically identical, and found for them a formula differing from the previous one by only one equivalent of water.

This formula is $C_{24}H_{18}O_{18},5NO_5$.

It is so like the previous formula—$C_{24}H_{17}O_{17},5NO_5$—that analysis alone would not be sufficient to justify the alteration without being supported by the amount of the yield. In fact, the new formula supposes a yield of 177·78 of pyroxylin for 100 of cotton, while the old formula corresponds to a yield of only 175. The direct experiments described above gave the figure 178.

All the gun-cottons we analysed were previously washed in a mixture of alcohol and ether, to remove some milliѐmes of fatty and soluble matters, then dried for several hours in a stove at a temperature between 40° and 50°.

All were of the composition above described, and gave the following figures:—

Carbon	25·00
Hydrogen	3·13
Oxygen	59·72
Nitrogen	12·15
	100·00

The action of Heat on Pyroxylin.—General Lenk ascribes the unsatisfactory results obtained in France by the Commission of 1846 to the fact that not sufficient attention was paid to the manner in which the pyroxylin was prepared, and to operating upon an insufficiently defined nitred product. By taking advantage of conditions most favourable to nitrogenization, he believes he has obtained a pyroxylin very difficult to decompose.

We will not discuss the theoretical value of this assertion, which does not seem to us to be very great. It is, on the contrary, more probable that gun-cotton would decompose more readily the less like cellulose, and, consequently, the more nitred it became. However this may be, General Lenk says that pyroxylin made by his process will not explode below 136° C.

We have made this important point the subject of numerous experiments.

These experiments were first made with an experimental matrass, open or closed, and plunged into a bath of boiling water.

All the samples heated in this way to 100° were sooner or later decomposed, and in a few minutes a disengagement of nitrous vapours took place.

The decomposition takes place in different ways, and cannot be reproduced at will. Four methods of decomposition at 100°, having the common characteristic of the disengagement of nitrous vapours, may be given :—

1. The pyroxylin detonates violently.

2. It decomposes without detonating, leaving a white, pulverulent, acid residue, partially soluble in water, containing no nitrogen, and forming about half the weight of the pyroxylin.

3. It leaves a yellow, amorphous, inexplosible residue, partially soluble in water, and reducing, like glucose, the double tartrate of copper and potash.

4. It gives a small residue (only 8 to 10 per cent. of its weight), and a black matter, in appearance like charcoal. In this case the matrass is entirely covered with a yellow powder, which dissolves in alkali with considerable disengagement of ammonia (this matter is apparently ulmate of ammonia). From this solution acids precipitate a dirty yellow body, also soluble in alkalies. The charcoal-like residue disengages ammonia under the action of potash. This production of ammonia by the simple action of heat from a matter formed of nitric acid and cellulose is very remarkable.

Other experiments made on various pyroxylins at 90° and then at 80° gave exactly the same results, except that decomposition took place after several hours instead of a few minutes.

At 60°, and even at 55°, pyroxylin is still decomposed. After a few days the matrass becomes full of dense reddish vapours, and the same non-nitrogenized pulverulent residue of which we have already spoken is obtained. No combustion was observed in these latter experiments.

We moreover produced detonation by putting about one gramme of pyroxylin into one of Gay-Lussac's copper stoves containing oil at only 47°. The pyroxylin thus decomposed was from a specimen prepared by forty-eight hours' immersion, and washing by Lenk's process.

These experiments plainly show that, contrary to General Lenk's assertion, his pyroxylin does not offer more resistance to the action of heat than that of Bouchet, the Austrian silicated pyroxylin having under all conditions behaved itself in the same manner as the others.

From its decomposing at about 50°, it may be asked whether pyroxylin is not liable to decompose even at the ordinary temperature. Is it, for instance, likely to detonate spontaneously when kept in large masses in magazines? Several chemists have given examples of the decomposition of pyroxylin at the ordinary temperature. They have generally mentioned as products of this decomposition nitrous vapours and several oxidized bodies like formic, oxalic, and acetic acids, and residues of gummy or saccharine substances, and have endeavoured to ascribe these instances of the alteration of pyroxylin to imperfect washing.

We will in the first place remark that it is easy to wash small quantities of materials, and that as the destructive action of sulphuric acid on pyroxylin is perfectly established, it is evident that the greatest care should be taken to eliminate every trace of it, and that consequently the most careful washing is necessary.

Without entering into the details of the known cases of the decomposition of pyroxylin at the ordinary temperature, we will describe the decomposition we observed in some specimens made in 1847, which had been washed with especial care either in pure or alkaline water.

Of twenty-eight samples placed in small stopped flasks, and a few grammes in weight, sixteen underwent alteration of some kind.

We took at hazard one of the altered specimens, and examined it. It was originally composed of six grammes of pyroxylin which had been washed in potash water and left since March 17, 1850, or fourteen years, in a flask imperfectly stopped. It had left a residue representing 79 per cent. of a dark yellow colour, and considerable amount of acid, but no sulphuric acid. This residue dissolved completely in water, and like glucose reduced tartrate of copper and potash. Its boiling solution gave a decided odour of vinegar, and, what was very remarkable, disengaged ammonia under the action of potash.

There are, then, under the ordinary atmospheric conditions, incontestable instances of the spontaneous alteration of pyroxylin, which, moreover, had been washed in alkaline water.

Now we have shown that pyroxylin is sure to decompose with heat, that in some cases it detonates, and in others apparently identical it is destroyed without combustion. Why should it not be the same at a low temperature? Why should we not add to the instances of simple decomposition those of detonation? The analogy is so evident that we need not have recourse to the supposition of imperfect washing to explain the combustion of pyroxylin.

The Hirtenberg pyroxylin itself exploded in the magazine at Simmering, and in the investigation made July 31, 1862, it was merely decided that the accident was due to spontaneous combustion. It has also been attributed to the ordinary powder also contained in the magazine, but this supposition is inadmissible, as, for several centuries, there has been no known instance of spontaneous combustion of gunpowder. We must not, of course, as was done in an Austrian paper, confound accidents during manufacture, carelessness of workmen, or faulty mechanism, with the explosions produced by no other cause than the reactions among the elements of the compound.

Comparison of Lenk's Pyroxylin with those of Bouchet relative to their Propulsive and Blasting Qualities.—It remains for us to give the results of the experiments made with Navet's pendulum to compare the propelling powers of these two kinds of gun-cotton. Twenty-five charges were fired with Lenk's pyroxylin, fifteen with those of Bouchet, three grammes for each charge, and round balls weighing each 25 grm. 50.

Taking first the medium velocity of the balls, and then the greatest and the least, we have,—

	Gun-cotton. Hirtenberg.	Bouchet.
Medium velocity . . .	385·36 m.	394·32 m.
Greatest „	441·53	485·94
Least „	357·63	357·63

Differences much greater than those presented by the above figures are sometimes found in firing from the same specimen. For instance, the pyroxylin brought from Austria by General Lenk was fired twice, giving:—

On February 17th	374·40 m.
„ March 8th	408·40

From these results we may conclude that both kinds have the same ballistic force.

In these experiments the gun was filled to the height of 0·05 m. It was proposed to ram it harder, reducing the height to 0·03 m.; but the first charge fired by this method, and with three grammes of General Lenk's pyroxylin, burst the gun barrel.

This accident has also happened in firing charges of the Bouchet pyroxylin, showing the resemblance between the explosive property of the French and Austrian pyroxyles.

We will not here describe all the attempts made by the Commission of 1846 to obviate the inconvenience arising from the too rapid combustion of pyroxylin, but will confine ourselves to those made for the same purpose by General Lenk.

He first unsuccessfully tried compressed cartridges, then some which he called long cartridges, formed of paper cylinders covered with gun-cotton yarn. With these, an Austrian 12-pounder charged with about 481 grammes of gun-cotton gave a velocity of 427 metres.

But this speed, though the greatest attained by the experiments in question, is less than that obtained in France with a similar gun, and with a charge of 2 kilogrammes of ordinary powder, which was about 480 metres, and which the Commission of 1846 endeavoured to attain by using 667 grammes of pyroxylin.

Now, it has not been proved that Lenk's cartridges would not injure pieces of ordnance, were the quantity of pyroxylin increased so as to obtain the same speed as in France.

The author of one of the Austrian reports recognizes the fact that the results obtained are unsatisfactory, and that the mechanical means employed to prevent the development of the injurious properties of the pyroxylin neutralize part of its propelling power; and arrives at the conclusion that the problem will be resolved only when firearms are made in which the injurious effect may be disregarded. This is also our opinion; but how to overcome the objection of the spontaneous explosions, which to us is the first consideration?

The result of our researches is that though the composition, method of production, and chemical properties of pyroxylin may be better known, the principal point—its use for firearms—remains in nearly the same state in which it was left by the French Commission of 1846.

There is nothing to lead us to suppose it possible, in the present state of our knowledge, to prevent the spontaneous explosion of pyroxylin, or to get rid of its injurious properties.—*Comptes Rendus*, lix. 363, 64, and *Chemical News*.

GLYCERIN—ITS MISSION (SO TO SPEAK) AS A REMEDY, AS AN ADJUVANT, AND AS A SOLVENT.

BY W. J. M. GORDON, CINCINNATI.

When I accepted this subject at the last meeting of the Association, I expected to have given it more attention than my time during the past year would permit. Not having investigated it as thoroughly as desirable, I will present what I have accomplished in connection with much that is not new, so as to present it as fully as possible, and leave it for the experiments and suggestions of all who may be interested in it.

Glycerin, it is generally known, possesses a wonderful range of solvent properties, dissolving many substances not soluble in alcohol or water. Its agreeable taste, harmless action upon the system, and perfect assimilation with human digestion, specially adapt it when other substances would be rejected; its sweetening property being almost equal to cane-sugar syrup, but differing from it in not being liable to fermentation; resembling oils, but, unlike oils, miscible with alcohol and water in any proportion; not volatile at ordinary temperatures, and not becoming hard at the freezing-point of mercury. Possessing these properties, it cannot but be an article of importance both in pharmacy and in the arts.

The high price, heretofore, no doubt, has kept it from many uses to which it is now applied. Recently, glycerin, adapted to the various purposes to which it is extensively used, has been produced at a lower price than alcohol, sugar, or oil, which it has come in competition with, and which places it seems specially adapted to fill to a considerable extent; and the large amount and low price at which it can be produced, makes it worthy of attention at a time particularly when every article of utility should be carefully looked after.

Medicinally, glycerin has been used for its nutritive and alternative effect, and in some cases with marked success, being admissible when cod-liver oil and other unpleasant substances would be rejected. These and its soothing effect in coughs, are the principal internal uses to which it has been applied alone. Its more important medicinal value is as a vehicle for the preparation of a great variety of remedies for both internal and external use.

It is a favourite article in combination with the hypophosphites, known as glycerole of hypophosphites, and never disagreeing with the most delicate stomach, as sugar is liable to do, is admissible when syrup is not.

Iodide of iron prepared with it in the place of syrup makes a handsome and permanent preparation.

Its preservative and solvent property being so much greater than that of sugar syrup, cannot fail to recommend it in the place of that substance for the preparation of ipecacuanha, senega, hive syrup, and such vegetable preparations as are liable to fermentation, —specimens of several I now exhibit made with glycerin, costing $2.00 per gallon, which are elegant in appearance, and will undoubtedly remain without change an indefinite length of time.

Its uses externally are numerous. For chapped skin and rough and excoriated surfaces, it has no equal; for sore nipples, skin diseases, ulcers of various kinds, to prevent excessive suppuration and cleanse the secreting surface.

It is highly recommended in deep abscesses with diseased bone, combined with iodine, which it dissolves. With many, it is a favourite mode of applying iodine and its salts.

It is used in cerates and ointments, which do not become rancid so soon when combined with it; as glycerole of lead, in place of Goulard's cerate, glycerin being used in the place of wax and oil; as glycerole of kino, which is said to be unchangeable; in the preparation of lactucarium in a liquid form, by which its activity and reliability are more certain; as glycerole of aloes, tar and arnica for external use. It is used with starch in the proportion of 1 oz. of glycerin to 70 grs. of starch for making an article called "plasma," as a substitute for lard or cerate. And it no doubt possesses advantage in preparing vegetable extracts, such as belladonna, aconite, and others for external use, as they can be readily mixed with it; for liniments, in the place of oil, as it will not become rancid; and has been suggested for the extraction of the active principles of vegetable substances in place of oil and fats, to be used in the preparation of cerates or ointments.

Incorporated with vegetable extracts, it will prevent mouldiness and keep them soft, and for pill masses liable to become hard it is a good addition. It may be used as an addition to poultices to keep them soft, or any article to be kept in a moist or plastic condition.

Its solvent and preservative properties are of great importance to the pharmaceutist. In the preparation of fluid extracts, it will be found to supply the place of alcohol and sugar to much advantage. My experience is such as to convince me that in most cases extracts will be more permanent by supplying the place of alcohol, used to preserve them, with glycerin. To fluid extract of jalap, *Veratrum viride*, *Cinchona aromat.*, and *Iris versicolor*, glycerin was added and all the alcohol evaporated out, specimens of which I now exhibit, presenting a handsome appearance. Sarsaparilla and those liable to fermentation will be much better preserved with it.

I have used glycerin as a menstruum in the preparation of extracts of cloves, nutmegs, and Ceylon cinnamon, and the preparations are elegant representatives of the substances from which they were made.

It dissolves the vegetable acids, most of the vegetable alkaloids, sulphuret of potassium, permanganate of potassa, sulphate of copper, zinc, iron, and potassa, alkaline, and some of the metallic chlorides;

Iodide of ammonium, cadmium, zinc, potassa, sodium, lime, and manganese;

Freshly precipitated carbonate of iron;

Most of the metallic oxides to some extent;

Nitrate of potassa, silver, copper, and lead;

Citrate of iron, citrate of iron and quinine, citrate of iron and strychnia, tartrate of iron and potassa;

Pyrophosphate of iron, and most saline substances.

Heating to give it greater fluidity will generally increase its solvent property.

It may not be amiss to name other purposes for which glycerin is largely used. Much the largest quantity used for any one purpose, except that of filling gas meters, is in the manufacture of hair oils, tonics, and washes, for which it is admirably fitted, taking the place of alcohol and castor oil, which are now too expensive for the purpose, and by its undrying property keeping the hair moist in appearance.

It is largely used in tobacco, and is particularly adapted to the article known as fine-cut, preserving it in a moist state an indefinite length of time; and, unlike sugar, molasses, and infusion of liquorice, which has been used for the same purpose, it will not turn sour, and is unchanged by exposure to the air.

Wine and liquor manufacturers use it to improve liquors, by giving body and removing the fiery taste.

It is used by manufacturers of woollen goods in place of oil, being more economical and not requiring soap to wash it out.

Manufacturers of cotton goods use it in size to prevent rapid drying.

Printers use it in place of molasses to make rollers, which will not dry and shrink.

It is used by artists in clay and plaster of Paris, to preserve it in a plastic form for modelling.

It is used in soaps.

For filling wet meters, used in measuring illuminating gas, it is now extensively used, and possesses decided advantage over whisky or any substance before used for the purpose. It is practically free from any objection, not evaporating at any ordinary temperature, and can be sufficiently diluted to prevent its absorption of more water from the gas, and not liable to freeze at any degree of cold meters are subject to, and rendering them free from the attention necessary if filled with whisky or water.

It deserves attention as a lubricator for fine machinery, not congealing or being affected by exposure to the atmosphere.

Numerous other applications have been made of it, and its uses will increase as its wonderful properties become known.—*American Journal of Pharmacy*, March, 1865.

ON THE FOOD OF MAN IN RELATION TO HIS USEFUL WORK.

BY DR. LYON PLAYFAIR, C.B., F.R.S.

Delivered at the Royal Institution, Friday, April 28, 1865.*

This discourse was in three divisions. The first division treated of the amount of food required for mere subsistence; then for the full health of the non-labouring adult; and lastly, of the quantity necessary for an active labourer. The second division of the discourse discussed the question whether there was sufficient potential energy in the nitrogenous tissues, and in the oxygen required for their transformation, to account for the dynamical actions within or without the body. The question as to whether the fatty and amylaceous ingredients of the food co-operated in this work was brought under review. The third division of the discourse treated of the secretions *per vesicam* and *per anum* as measures of work.

In the first division of the discourse, a number of subsistence and low dietaries were recorded, and, as a general average, the following diets were given in ounces of 437½ grains:—

	Subsistence diet, oz.	Diet in quietude, oz.
Flesh-formers	2·0	2·5
Fat	0·5	1·0
Starch, etc.	12·0	12·0
Starch equivalent of heat given . . .	13·2	14·4
Carbon in food	6·7	7·4

The speaker then examined the food of soldiers during peace as giving a fair average of food required by adult men, of soldiers engaged in work like the Royal Engineers, and of those exposed to the fatigues of war, as giving diets necessary for labourers. The following averages were given in ounces:—

	Soldiers during peace.	Royal Engineers.	Soldiers during war.	Active labourers.
Flesh-formers . .	4·2	5·1	5·4	5·6
Fat	1·4	2·9	2·4	2·3
Starch, etc. . . .	18·7	22·2	17·9	20·4
Starch equivalent .	22·4	29·4	23·5	25·9
Total carbon . . .	11·6	14·8	12·7	13·9

Active labour was defined to consist of work which would enable a man to walk twenty miles every day throughout the year, except on Sundays. The labour during war is much the same, for soldiers marching fourteen miles daily, with 60 lb. weight of accoutrements, exercise labour amounting to 776,160 foot-pounds, while the pedestrian walking twenty miles exerts a force of 792,000 foot-pounds.

In the second division of the discourse, the speaker showed that the common experience of mankind is in favour of the nitrogenous ingredients of food being the source of dynamical work. Horses and men, when labouring, are provided with food rich in such substances, and their labour was shown by numerical data to be proportional to the amount of the former. Thus, the work of a horse, divided by the work of an ox, gives the ratio 1 : 1·43, while the plastic food of these animals, treated in the same way, yields 1 : 1·44. In the same way, the work of a horse is eight times greater than that of a man, and the plastic food used for the external dynamical labour of each is nearly in the same proportion. The quotation of decomposition used by the author is the following one:—

Albumen.		Urea or amido-carbonic acid.	Carbonic acid.	Water.

$$C_{24}H_{33}N_6O_{16} + 100\,O = 3\,(CO_2(NH_2)_2) + 21\,CO_4 + 13\,(H_2O_2)$$

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* This discourse has since been published *in extenso* by Edmonston and Douglas, Edinburgh.

In this equation, the small quantity of sulphur in albumen is viewed as oxygen. The simplicity of the equation is remarkable; for, of the two forms of carbonic acid produced, the one, amido-carbonic acid, passes away *per vesicam*, and gaseous carbonic acid *per halitem*. Seven times as much carbon should appear in the latter as in the former secretion, and this is exactly what has been found in the case of dogs fed with flesh free from fat. Using Andrew's units of heat and the above equation, one ounce of transformed tissue (28·35 grammes) would raise 126·5 kilogrammes of water 1° C., or converted into its mechanical equivalent by Joule's number 425, would raise 53,762 kilogrammes one metre high.* These numbers are easily applied. Soldiers during peace are well exercised by a march of seven miles daily. Their useful external work is therefore 38,333 metre kilogrammes; while the potential energy in the 3·94 oz. of flesh-formers (remaining after deducting the amount in the alvine evacuations) is 211,822 metre kilogrammes. But the internal dynamical work of the heart, respiratory and other movements, require 107,524 metre kilogrammes, so that the residue of 104,298 metre kilogrammes represents nearly three times as much potential energy as useful work. The same method of calculation being applied to a labourer, shows that the 3·5 oz. of flesh-formers, applied to external dynamical work, would, after deduction, yield 172,125 metre kilogrammes, the useful work of the labourer being 109,496 metre kilogrammes.

The speaker then showed that the fat contained in the muscles was quite insufficient to account for the useful work done. While the wasted muscles of a non-labouring man would yield 506 kilogramme units of heat, the fat resident in them would give only 87 kilogramme units.

The third division of the discourse treated of the secretions as measures of work. A man living on a subsistence diet should excrete 267 grs. of urea daily, and we find that 264 grs. have been actually found under such circumstances. Soldiers on the diet of peace should have from 560 to 580 grains of urea in their excretions, and the mean of Haughton of 575 grs. represents this quantity. An active labourer ought to have 735 grs. of urea in the urine, and forgemen in engineering works were found to have 740 grains, while active pedestrians were found to have as much as 800 to 850 grs. The same people on days of rest, as on Sundays, had only 500 grs.

The amount of nitrogen secreted *per anum* was viewed as the measure of digestive or assimilative work. One-twelfth of the flesh-formers consumed in food pass away in a state of health in the alvine evacuations as exhausted digestive ferments. These, the speaker contended, were merely slightly oxidized flesh-formers, ready for assimilation, and secreted to prepare the food for absorption into the blood. A small portion of them were exhausted in the act, and were then excreted *per anum*, but much the largest portion was reabsorbed into the blood, and was used for the formation of tissues.

In bad digestion, or with excess of food, more than one-twelfth of the flesh-formers is necessarily found in the alvine evacuations.

DATURA STRAMONIUM AND *D. TATULA.*

The following is given in connection with the spontaneous return of hybrid plants to their parental forms, and is also interesting from the fact that both are now in use for medicinal purposes.

Naudin maintains that hybrid plants, however constant at first, tend in subsequent generations to a separation of the two specific elements, which are, as he expresses it, rather intermixed than truly combined, so that they would at length resolve themselves into the two parental types, or by failure on one side return to the one or the other. In the 'Flore des Serres' for July, 1864, he gives the results of his experiments upon our common sorts of thorn-apple, *Datura Stramonium* and *D. Tatula.* These have more commonly been taken for varieties of one species; but their specific distinction has been maintained, especially of late, by various arguments. According to Naudin, they are truly distinct species which do not sensibly vary. One always exhibits green stems and

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* In this estimation the carbon in urea is supposed to be oxidized into carbonic oxide; but it would be still more in favour of the view if urea were taken as the residue, and six atoms more of hydrogen were oxidized.

pure white flowers; the other dark purple stems and violet-tinged flowers. These two thorn-apples M. Naudin crossed in 1855, and obtained one hundred or more hybrids, both *Tatula-stramonium* and *Stramonio-tatula*, both just alike, and exactly intermediate between the two species in the coloration of the stem and flowers. They had, however, the peculiarity of a gigantic size, attaining at least twice the size of their parents, and a tendency to sterility, which was manifested in the failure of all the flower-buds which were produced at the first forking of the stems. The later flower-buds opened, however, and were perfectly fertile, the pods being as large and as full of good seeds as those of either parent. In 1861 the seeds of *Stramonio-tatula* were sown, and produced a second generation like the first. Seeds of this crop were sown in 1862, and twenty-two seedlings were preserved for experiment. Nine individuals returned as completely to *D. Tatula* and five did to *D. Stramonium.* Two others seemed to be *D. Tatula*, and were equally reduced in and fertile from the first forks, but they still showed in their paler colouring a trace of the other ancestor. The remaining six of the twenty-two showed somewhat more of it, both in colour and in the tallness and lateness of fructification. "Here, then," says Naudin, "is a hybrid completely intermediate between the two parent species when left to itself, fecundated by its own proper pollen, is spontaneously dissevered at the second generation, dividing its offspring between the two species."—*Medical Press.*

ON THE VEGETABLE ORIGIN OF DIAMONDS.

We have already mentioned that Professor Goeppert obtained the prize offered by the Dutch Scientific Society for an Essay on the vegetable origin of Diamonds, and we are now able to give a short abstract of this highly interesting essay.

Since Lavoisier showed that diamonds were composed of pure carbon very different opinions have been entertained about their origin, some believing them to be produced by Plutonic, others by Neptunian agency. Newton inclined towards the latter view, and Brewster agrees with him. In 1842 Liebig pronounced the formation of diamonds to be the result of an uninterrupted process of chemical decomposition. "Imagine this chemical decomposition taking place in a fluid rich in carbon and hydrogen, and you have a combination still richer in carbon, out of which will issue as a final result of its chemical decomposition, pure carbon, and that in a crystallized form." Indeed a high temperature is adverse to the formation of diamonds, as diamonds become black when subjected to a high degree of temperature, and, according to Despretz's experiments, they are even converted into graphite and coke. The black diamonds, or so-called "carbonates of Bahia," are in part a mixture of uncrystallized carbon and diamonds, as shown by the process of combustion, to which at my desire they were submitted by Professor Löwig. That diamonds originated under Neptunian agency is further proved by the frequent occurrence of crystals in them. I have seen them in hundreds of different specimens, and even small cavities containing them. In my essay I have given ample proof that at one time diamonds were soft bodies. Hitherto only one diamond, in the possession of the Emperor of the Brazils, has been known, on which the impression of a grain of sand was visible. I have before me a rhombic dodecahedron, on the whole surface of which impressions of grains of sand are visible, and a similar crystal of the black diamond on which the same impressions exist. In a third there is a cavity with bent and broken crystals of an unknown kind. Two others, an octahedron and a rhombic dodecahedron, have on their surface deep impressions of crystals which are not those of diamonds. The Neptunian origin of diamonds can therefore no longer be doubted. G. Bischof also thinks that after the discovery of iron pyrites in the diamond any doubt respecting the formation of diamonds in a moist way has been dispelled. In close connection with these observations is the question about the vegetable origin of diamonds, which in a measure was answered by Newton, who regarded them on account of their great power of reflecting light, long before their true chemical condition was ascertained, to be coagulated fatty or oily bodies. Jameson and Wilson endeavoured to prove this theoretically, Petzholdt practically, by the vegetable cells found in the ashes of diamonds. The vegetable origin of coal and anthracite, and their sedimentary formation, having been thoroughly established, I examined, starting from this point, graphite (hitherto regarded as being without structure, but doubtless having a Neptunian origin) and the diamond;

and by the experience I have gained from observing, for a number of years, chalcedony and amber, I am able to distinguish sufficiently between mechanical formations and formations of a vegetable origin. I have not yet attained any results with respect to graphite, but in diamonds I have found numerous foreign bodies enclosed, of which if they cannot be said to be evidently and undoubtedly vegetable in their origin, it would on the other hand be difficult to deny their vegetable nature altogether. The careful figures which will accompany my essay will enable others to judge on this point, and will, if nothing else, open up the way for further researches.—*Journal of Botany.*

A NEW OIL-SEED FOR THE COLONIES.

Madia is a genus of South American herbaceous plants, belonging to the Natural Order *Compositæ*, one of the species of which, *Madia sativa*, is of value for the oil yielded by its seeds upon pressure. It is a native of Chili, where it has long been cultivated for the sake of its oil, which is of excellent quality. It grows like the Aster; the blossom is yellow, and put together in clusters; the stalk is from 3 to 5 feet high, grows compact, and requires a sandy soil. The seed is like that of the sunflower, but much smaller.

In Chili the oil is used intead of olive oil, the finer quality for edible and the grosser for illuminating purposes. It was introduced from Chili into Asia Minor with great success, thence into Algeria and the south part of France, and into some warm parts of Germany, and is said to be more abundant in oil than any plant introduced into Europe. It attracted attention in Europe previously to 1839, in consequence of Mr. Bosch, the superintendent of the gardens of the King of Würtemberg, having successfully cultivated it in Germany on a large scale. He found that, as compared with rape and poppies, the amount of oil yielded per German acre was as follows:—

Rape yields 240 lb. of oil per German acre.
Poppies „ 264 „ „
Madia „ 242 „ „

This oil does not congeal at 19° below zero of Réaumur, but only becomes a little less fluid, which makes it a valuable material for keeping machines in order.

In Europe, the seeds are sown in October, and from four to six pounds are required per German acre. The crop is of the easiest management, and the only precaution to be taken by the cultivator, which it is important to notice, is, that the seeds must be thrashed out soon after the crop is cut, otherwise the glutinous stalks, when heaped up, ferment and injure the seeds.

The Madia is known in Germany as the "Olbegende Medikraut," or "Olmud," and seed may be had of Messrs. Booth's successors, No. 32, Grosse Reichenstrasse, Hamburg. —*Technologist.*

ON THE USE OF COCA LEAVES.

BY DR. ABL, OF ZARA.*

The Novara expedition enables me to speak of one of the most proved narcotic substances, well qualified to become to soldiers and sailors as faithful a companion as tobacco is now.

It is the Coca, the leaves of different varieties of *Erythroxylon Coca*, Lam., a shrub which is cultivated to a great extent in South America, especially in Brazil, Bolivia, Peru, Ecuador, Venezuela, New Granada, Guiana, as well as in the East and West Indies. These leaves have rather a good taste, and several very distinguished travellers, as Pöppig (see Sir William Hooker's 'Journal of Botany'), Weddell, Von Martius, etc., have pronounced very favourably as to the effect of chewing them. It has been proved that they show in flavour as well as in taste some analogy to the inferior kinds of tea. At the same time, they are somewhat bitter-aromatic, not inconsiderably exciting the secretion of saliva.

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* From an article on Troops' Beverages, in the 'Austrian Military Journal,' translated by E. Goeze.

But Von Tschudi and Dr. Scherzer give the most remarkable accounts of the stimulating effects of the coca.

The former informs us that during his stay in Peru, he employed an Indian in some very fatiguing digging, for five days and five nights, and that this man did not partake of any food during the whole time, and rested even only two hours in the night; but he constantly chewed coca leaves, consuming an ounce in every two or three hours. After the work was done, the same individual accompanied Von Tschudi during a ride of twenty-three leguas (sixty-three English miles) over elevated plains, keeping pace with his mule, and taking only a short rest for his "Chacchar" (coca-chewing). After all these hardships, he was quite willing to go through them again, without eating anything, provided he had plenty of coca.

A similar case is reported by Dr. Scherzer (who accompanied the Novara expedition), where an Indian accomplished a journey of eighty-three leguas (243 English miles), from La Paz to Tama, in four days. After resting for one day, he set out for his return, on which he was obliged to pass a mountain of 13,000 feet in height. He actually returned on the fifth day, and during the whole journey there and back he had only taken a little roasted maize and plenty of coca. Those who once take to coca-chewing can scarcely abstain from it, and in this respect coca shows even a greater power on human habit than tobacco does.

After all the observations lately made, a moderate use of coca does not appear to be injurious to health, and Von Tschudi even feels inclined to think the contrary. He supports his opinion by showing that many Indians attain a very great age without losing any of their mental faculties. If a moderate use were really injurious, an age of 130 years, which is often met with amongst the Indians of Peru, would seem to contradict it.

Von Tschudi was, I think, the first to assert the fact, and Dr. Scherzer, only a few years since, also tried to show that the importation of coca leaves to Europe would very likely be accompanied with favourable results. Both propose to apply them where human strength is subjected to extraordinary hardships. Coca, in the hands of cautious captains, will very probably put a stop to the much more disgusting habit of chewing tobacco, and would certainly diminish the number of those who, after shipwreck, perish from want of food.

Coca would prove equally useful in war, as there can be but little doubt that the unhappy results of a lost battle must very often be attributed to the exhaustion of the soldiers after a great many privations, and in not being properly provided with food.

Although the above-mentioned remarkable effects of coca have at least been partially known in Europe for some time, it cannot be said that even a superficial chemical examination of these leaves has been made. This may be attributed to the fact that the coca, notwithstanding the immense consumption in its native country, has but very seldom been brought to Europe. A few travellers brought away small samples, to give away afterwards as curiosities for museums, etc.

Dr. Scherzer, during the circumnavigation of the Novara, bought a good quantity of coca leaves in Lima, which were in a perfect condition, and after his return to Europe he sent them to Mr. Wöhler, Professor of Chemistry in Göttingen. This gentleman trusted his assistant, Dr. A. Niemann, with the chemical analysis, referring to its qualitative and quantitative nature; and to the careful examination of the latter, we are indebted for the cocaine, a new organic base in the coca leaves (analogous to caffeine, the operative principle in coffee, to theine, theobromine, etc.).—*Technologist.*

NEW REMEDIES.

Essence of Mustard.—Olei Sinapis Essent. 1 part; Sp. Vini Rect. 60 parts. This forms a good substitute for a mustard poultice, and may be used in all cases where the application of mustard is indicated.

It should be sparingly sprinkled on piline and applied to the part; the expedition with which it may be applied, and the rapidity of its action, are manifest advantages.

The application of mustard, in cases of mania, has been found to have a remarkable effect. Dr. S. Newington, in the 'Lancet' of June 7, describes several cases in which its use was attended with most beneficial effects in calming the excitement of the patient, and producing sleep. It was applied, either by clothes steeped in mustard and water, to the whole legs, and to the lower part of the abdomen ; or as a mustard plaster, composed of 1 part of mustard to 10 parts of linseed meal, spread upon brown paper, applied to the abdomen, interposing a piece of muslin to keep the skin clean ; or as a mustard-bath for the whole or part of the body.

Dr. T. B. Henderson, in a communication to the 'Medical Times and Gazette,' recommends the two following new remedies for gonorrhœa :—*Oil of Yellow Sandalwood.* The dose of this is from 20 to 40 minims, three times a day, diluted with 3 parts of rectified spirit, and flavoured with oil of cassia, or oil of cinnamon. It has the advantage of being a pleasant medicine, not liable to cause sickness, agreeable to the taste, and grateful to the stomach. In Dr. Henderson's opinion, it is superior to both copaiba and cubebs.

The other remedy is *Gurjun Oil* or *Wood Oil*, the product of *Dipterocarpus turbinatus*, an immense tree, growing in different parts of India. This remedy has been tried, by Dr. Henderson, only in cases where copaiba had been fully tried and failed. It was given in doses of a teaspoonful, two or three times a day, uncombined, and with marked success, without producing any inconvenient symptom.

Although this is described by Dr. Henderson as a new remedy, it may be well to state that "Wood-oil" has long been used in India, and in this country it has sometimes been substituted for copaiba.

ACCIDENTAL POISONING BY LAUDANUM.

An inquest was held on Wednesday, May 24th, at Watchet, Somersetshire, before W. W. Munckton, Esq., on the body of Mr. Isaac Wood, a retired Custom-house officer, who died from the effects of a dose of laudanum taken by mistake. From the evidence of Mrs. Wood, his wife, it appeared that on the previous Friday morning, the deceased asked his wife to give him a dose of his medicine, but he appears to have been impatient of delay, and got out of bed and swallowed what he supposed to have been his medicine, but on his wife entering the room she discovered that he had taken laudanum, which was kept on the mantelpiece by the side of a bottle containing medicine, which Mr. Wood was in the habit of taking for a pain in the chest; both the medicine and the laudanum were obtained from Mr. Date, chemist, the laudanum having been supplied by Mrs. Date without any label,—in fact, according to the evidence of this witness, neither of the bottles were labelled. Mr. Wright, surgeon, was immediately sent for, who stated that he found the deceased in a state of profound collapse; he was quite sensible, and told witness that he had taken about two teaspoonfuls of laudanum, but he was of opinion that a much larger quantity had been taken. Mr. Wright administered an emetic twice and gave other remedies, attending him until he died on the following afternoon. A *post-mortem* examination revealed extensive disease both of the brain and of the heart, and it was the opinion of witness that syncope was the cause of death, produced by prostration of the system, caused by the poison acting on the heart in its diseased state. The jury returned a verdict that "deceased died from taking a quantity of laudanum incautiously administered by himself, in mistake for medicine." The jury subsequently added, that "they strongly deprecated the selling or keeping of poisons in bottles to which labels were not attached, and recommended that the same be kept under lock and key." Mr. Date explained that the laudanum was sold by Mrs. Date in a hurry, and in consequence was not labelled. It was the first time that a bottle had been sent from his premises without a label, and he would take care that the same did not occur again. The Coroner commented on the dangerous practice of sending out drugs without labels, and although in this case the bottles were different in size, yet a person near-sighted as the deceased was reported to be, might easily make a mistake. This, however, was no excuse for the bottles not being labelled, and he thought that every one connected with the accident was to blame.

MISCELLANEA.

The Adulteration of Medicine with Methylated Spirit.—An inquiry has been held by Mr. Richards, deputy-coroner, at the Crown Tavern, Charles Street, Mile End, respecting the death of a child named John R. Lawson, and in the course of the proceedings a very abominable sort of adulteration of medicines was made known. Mrs. Lawson, the wife of a beer-shop keeper, said that deceased was ailing with the whooping-cough, and she took him to a surgeon in Newington Causeway. The name "Tanner" was on a plate outside the door, and the house was a private one. Mr. Tanner said the child had chicken-pock, and was very dangerously ill. He gave a bottle of medicine, and some ointment, for which he charged 1*s*. 3*d*. She gave the medicine three times, and each time he was violently sick from it. The next morning she removed from Southwark to James Street, Mile End, and as the child seemed dying, she called in Mr. Reilly. Mr. F. J. Reilly, M.R.C.S., said that the child died from acute bronchitis. He had made a slight chemical analysis of the medicine produced, and found it to contain poppies and iron prepared with methylated spirits of wine. Methylated spirits of wine was used by French polishers as a substitute for naphtha, which destroyed their eyes. The Government allowed spirits of wine to be sold free of duty if it was methylated or adulterated by some naphtha being passed through it to render it unfit for drinking purposes, and consequently it could be bought for 6*s*. 6*d*. a gallon, while spirits of wine unsophisticated cost 22*s*. a gallon. It was most improper to use methylated spirits for medicine—it would sicken any patient, but it had not caused the deceased's death. The jury said that even the smell of the medicine was disgusting; it was like bad naphtha. Mr. Reilly said that he could not find the name "Tanner" in the 'Directory.' The jury returned a verdict that the deceased died from bronchitis from natural causes, and the jury strongly deprecated the use of methylated spirits for medicine in the place of pure spirits of wine.

Preservation of Flowers with their Natural Colours.—Dried flowers, in their natural colours, have for some time past appeared for sale in the shops. The mode in which the operation is effected is this:—A vessel, with a moveable cover, is provided, and having removed the cover from it, a piece of metallic gauze of moderate fineness is fixed over it, and the cover replaced. A quantity of sand is then taken sufficient to fill the vessel, and passed through a sieve into an iron pot, where it is heated, with the addition of a small quantity of stearine, carefully stirred, so as to thoroughly mix the ingredients. The quantity of stearine to be added is at the rate of half a pound to one hundred pounds of sand. Care must be taken not to add too much, as it would sink to the bottom and injure the flowers. The vessel with its cover on, and the gauze beneath it, is then turned upside down, and the bottom being removed, the flowers to be operated upon are carefully placed on the gauze and the sand gently poured in, so as to cover the flowers entirely, the leaves being thus prevented from touching each other. The vessel is then put in a hot place, such for instance as the top of a baker's oven, where it is left for forty-eight hours. The flowers thus become dried, and they retain their natural colours. The vessel still remaining bottom upwards, the lid is taken off, and the sand runs away through the gauze, leaving the flowers uninjured.—*Journal of Society of Arts.*

Accidental Poisoning by Oxalic Acid.—A melancholy event has occurred at Malton, whereby Mr. William Moorhouse, a tradesman of the town, has met sudden death. From a coroner's inquiry, which occupied most of Thursday, June 15, it was ascertained that death had resulted from a very strong dose of oxalic acid; and from the evidence of deceased's widow it appeared she had seen her husband that morning drink what was supposed to be a cupful of Epsom salts and at once retire to bed, where he died a distressing death in about an hour. The cup, from which Mr. Moorhouse had drunk, contained crystals which proved to be those of oxalic acid, a solution of which is constantly in use in saddlery, deceased's trade. The jury found that the deceased had poisoned himself by drinking oxalic acid in mistake for Epsom salts.

Poisoning by Nitrate of Silver.—A little boy, about ten years old, in company with two others, entered the shop of Mrs. Crowe, chemist, Tredegar, to make some trifling purchase, and, unobserved, took away a bottle containing caustic. Believing the contents of the bottle were sweets, the boy distributed the caustic to his companions and upwards of twenty other children, but seeing one another's lips turn black, and some of the children feeling a burning in the throat, they began to cry. Fortunately none had swallowed sufficient to cause death, though several were much frightened, and suffered a little from the effects of the drug.

Assassination by Poisoned Clothing.—A trial of a very remarkable kind has just taken place at Bermuda. A man of the name of Edward Cook Swan was indicted for having in his possession a number of trunks containing a quantity of clothing which had been worn by persons who had died of yellow fever; this was mixed with new flannels and other articles. The defendant was charged with having these things in his possession under circumstances which threatened, to his knowledge, a real danger to the neighbourhood. After a lengthened inquiry, the main charges were proved to the satisfaction of the jury, who brought in a verdict of guilty.

The case is one of much interest, not only from its novelty, but from the fact that Dr. Blackburn, a Confederate surgeon at present under arrest at New York, will shortly be tried in that city for attempting to import yellow fever into the northern ports of America by the introduction into them of clothing which had been worn by persons who had died of that disease. As to the existence or non-existence of this plot, the chief justice who presided at the trial of Swan reminded the jury that they must not permit their just indignation or natural horror of so foul a scheme to prejudice their minds against the prisoner. The conviction of Swan has invested the subject with a painful interest as to the complicity of Dr. Blackburn in a plot of at once so novel and revolting a kind.—*Lancet.*

Child Poisoned with Godfrey's Cordial.—An inquest was held at the Cleveland Hotel, Hartlepool, on Wednesday, before Mr. Settle, coroner, on the body of William, infant son of William Taylor, bolt maker, Nugget Street, California, who had died suddenly on the previous day. From the evidence of the mother it appears the child was two months old, and was a healthy child, but in consequence of the child being very cross the mother was persuaded to give deceased some of Godfrey's Cordial. She obtained some, and administered it occasionally, and the child was pacified thereby. On the evening of Monday, a pennyworth of the cordial was obtained from a small shop, kept by Mrs. Jordison. About nine o'clock the mother administered a teaspoonful, and the child shortly afterwards made a peculiar noise in the throat. The sound appearing to become worse, the husband went to Dr. Botham's, who sent a bottle of medicine, but the child was in a state of stupor, and the medicine could not be administered. The child remained in that state up to the time of its death, which was at three the following morning. Mrs. Jordison, grocer, said she was aware that Dr. Botham ordered magnesia for the child, but it was not until she had recommended Godfrey's Cordial. She obtained the cordial from Mr. Mandall, of Stockton, and it is the first bottle she had ever had for sale. The dose she ordered was half a teaspoonful. She believed the cordial would be strong, as the bottle was near the bottom. Dr. Botham said his opinion was, that the child had died from an over-dose of opium. Mrs. Jordison was recalled, and admitted that she had put ten or fifteen drops of laudanum into the pennyworth of Godfrey's Cordial for the child. The jury returned a verdict of "Died from an over-dose of opium, sold and administered in ignorance of its effects." They also strongly expressed an opinion, that there should be further legislative restrictions as regards the sale of poisons.—*Newcastle Weekly Chronicle*, May 27th, 1865.

Death from Opium.—At an inquest held before Mr. Richards, at Upper George Street, Bromley, on the body of Mary Ann Beale, aged 69, it appeared that the deceased had been in the habit of taking opium for the last twenty years, and had purchased fourpennyworth (four scruples) of solid opium of Mr. Bailey, chemist, Bow. She dined about one o'clock, and, as was her custom, went to lie down. She was suddenly seized with a fit, and died. A *post-mortem* examination was made, and the medical evidence given was to the effect that death had resulted from serous apoplexy, accelerated by small doses of opium.

Are Vichy Lozenges a Drug or a Sweetmeat?—Great commotion has been excited among the Paris grocers and confectioners by a prosecution instituted against one of their number by the École de Pharmacie. These persons had hitherto always sold the Vichy lozenges without opposition, but the École de Pharmacie maintained that, being composed of bicarbonate of soda, they are neither more nor less than a drug, and that their sale by other than licensed *pharmaciens* had been merely tolerated, and would henceforth be disputed. "But," replied the confectioners, "Vichy waters themselves, solely on account of the soda they contain, are medicinal; and yet an Imperial decree authorizes a company to sell not only these, but the lozenges in question, by means of their agents." Moreover, a case was decided in favour of the confectioners in an action brought by the *pharmaciens* at Vichy. Either the Vichy lozenge is not a medicament, or an Imperial decree has authorized a commercial society to commit an infraction of the law by selling it without a pharmacien's diploma. The tribunal, without troubling itself with the delicate point of interpreting the legal value of an Imperial decree, has simply declared that the Vichy lozenge is a medicinal agent, and convicted the confectioner for the illegal practice of pharmacy.

Poisoning by Lead.—The following details were educed at an inquest before Mr. Richards, held in Schoolhouse Lane, Ratcliff. The investigation was into the circumstances attending the death of Elizabeth Wood, aged 55, who had died in violent convulsions. The deceased had been married, but had been obliged to leave her husband owing to his misconduct. He denied her any assistance, and she was left with her aged mother, nearly 80 years old, to support. About four months ago, she sought and obtained work at Messrs. Johnson's whitelead factory, in Limehouse. She was then in good bodily health. She laboured there from six o'clock in the morning till six o'clock in the evening, and her wages for these twelve hours were 1*s.* 6*d.* These were the regular hours, but sometimes the work went on till nine o'clock, or even till eleven o'clock at night, and then the last five of these seventeen hours was reckoned "overtime." There were about twenty women at this factory thus employed, and the evidence recorded that they were for the most part young. The unfortunate woman who commenced the work well, soon fell ill, poisoned by the occupation. Her joints became weak, her body wasted, her teeth became black, and she got palsied. With the first effects she went to a doctor, who told her she must inevitably die from the lead poisoning unless she left the work. But she asked, what could she do? She had her old mother to support as well as herself, and she had no choice but to go on or starve. She did so; and first was unable to work on all days in the week, then could struggle only on some, and, finally, could not get to the place at all; then she was seized with convulsions, and died. The doctor to whom she had been gave evidence that her death resulted from lead poisoning, accelerated by want of food. Doubtless she was rendered unable to take or eat sufficient food by the state of her teeth and gums, etc., from the poisoning of the blood. Some constitutions gave way under the action of the lead poisoning much sooner than others. The jury gave a special verdict, embodying with the medical reasons given in evidence an opinion that, "considering the deadly nature of the occupation, the hours of employment in whitelead factories are too long, and also that it would be desirable that there should be a systematic inspection of such establishments by a Government officer."—*Times.*

Poisoning by Arsenic.—An inquest has been held at Wrexham before B. H. Thelwall, Esq., respecting the deaths of a woman named Millington, and her four children, who were taken suddenly ill with vomiting and all the symptoms of arsenical poisoning; death took place within a space of a few days. Edward Millington, the husband, also suffered in a similar way, but recovered; he attributed the sickness to some bread of which all the family had eaten, but it was stated that some of the children were attacked before the bread in question was purchased. A *post-mortem* examination of the bodies was made, and the contents of the stomachs, etc., were forwarded to Dr. Edwards, of Liverpool, for analysis, the result of which plainly showed that death in all the cases had been caused by arsenic. Dr. Edwards also analysed some of the bread, flour, and sugar, but found no trace of poison in them. As the case appeared to be surrounded with considerable mystery, at the suggestion of the coroner, the inquiry was adjourned.

Suicide by Paraffine Oil.—Some time since Mr. Payne held an inquest on the body of Mrs. Maria Elizabeth Brown, aged 44, who lived at Deptford Lower Road. It was stated that a short time since, her child was robbed by a woman, whom the deceased had prosecuted, and she had been so persecuted by this woman that her mind was affected, and it was thought by her husband that this was the cause of her taking the paraffine oil. Mr. Turner, surgeon, was called in, and he stated that she took two large doses of the oil; she also attempted to cut her throat, but death was caused by the paraffine, and the jury returned a verdict that the deceased committed suicide by taking a quantity of paraffine oil while in a state of unsound mind.

Poisoning by Burnett's Solution of Chloride of Zinc.—In a case of poisoning reported in the 'Lancet,' in which a woman swallowed an ounce and a half of this solution, it was observed that, forty-eight hours after death, notwithstanding the great heat of the weather, no decomposition had taken place, and in examining the intestines no disagreeable odour was apparent, owing to the antiseptic property of the poison taken.

Oxalate of Cerium and Compound Tincture of Valerian in Sea-sickness.—Mr. C. W. Walsh, surgeon, in a letter to the 'Medical Times and Gazette,' states that he has found two grains of oxalate of cerium and one drachm of compound tincture of valerian invariably gives great relief. The dose may be administered at intervals of thirty minutes.

Suicides by Cyanide of Potassium.—An inquest was held by Mr. Payne, coroner for the City of London, on the body of Edward H. Hawkins, of the Coldstream Guards, who committed suicide by swallowing about a drachm of cyanide of potassium, which he had procured from a chemist under the pretence that he required it for the purpose of cleaning his gold lace. It appeared from the evidence that he had quarrelled with a young woman, who had, however, afterwards met him by appointment, and both agreed to take poison. In the case of the young woman the poison was ejected, and her life was saved.

An inquest was also held at Peckham by Mr. Carter, coroner for Surrey, on the body of Mr. James W. Trist, aged 31, who was found lying on the turf in Nunhead Cemetery. Dr. George Webster was called in, who found the deceased dying from the effects of a large dose of cyanide of potassium—a bottle containing some of this salt was lying by his side. It was stated in evidence that the deceased had lately given way to intemperate habits. A letter, written to his wife, was read, in which he said he wished to prove that he had the courage to commit the act he had hinted to her, and that he now constituted himself a judge of the Divorce Court, and left her. The jury returned a verdict "That the deceased died from poison, administered by his own hand, in Nunhead Cemetery, while of unsound mind."

REPORT OF THE SELECT COMMITTEE ON CHEMISTS AND DRUGGISTS BILLS, 1865.

Your Committee have examined witnesses on the general questions raised by the provisions contained in the two Bills committed to them, and have also heard evidence in support of the Chemists and Druggists (No. 1) Bill.

1. Your Committee then passed the following resolutions:—

> "1st. 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.
>
> "2nd. That the Bill 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."

2. By the adoption of the second resolution as an amendment to a proposal that persons compounding medicines from the prescriptions of medical men should also be examined, your Committee decided against the principal provision contained in the Chemists and Druggists (No. 1) Bill, and they accordingly resolved to proceed with the Chemists and Druggists (No. 2) Bill.

3. After several clauses of the Bill were passed, considerable difficulty arose in providing for the first formation of the Council to which the duty of regulating the examination of Chemists and Druggists was to be intrusted; and your Committee, considering the advanced period of the Session, were compelled to abandon the expectation of any useful result from a further consideration of the Bill.

4. Having, therefore, disposed, *pro formâ*, of the remaining clauses, they came to the following resolution:—

> "That inasmuch as there appears to be little prospect of any satisfactory termination to the labours of the Committee in the present Session, it is desirable that the evidence, so far as it has been already taken, and the proceedings of the Committee, be reported to the House, accompanied by a recommendation that the Government should, early in the new Parliament, bring in a Bill on the subjects referred to the Committee."

5. Your Committee have in conclusion to report, that, in their opinion, it is not expedient to proceed further with either of the Bills which have been committed to them.

REVIEWS.

The Science of Home Life. Based on the Third Edition of 'Household Chemistry.' By Albert J. Bernays, Professor of Chemistry and Natural Philosophy, and of Practical Chemistry, at St. Thomas's Hospital Medical and Surgical College; late Lecturer on Chemistry and Practical Chemistry at St. Mary's Hospital, etc. etc. London: W. H. Allen and Co. 1862. 8vo, pp. 396.

If neither brilliant nor original, this is at least a solid and useful work to emanate from a Professor of Chemistry. To take a scientific view of common things, to discuss it in a lively and popular manner, and so to bring within reach of those who have neither the time nor the inclination to study deeply, the explanations which philosophy can give of the phenomena of daily life, requires no mean talent and deserves no small praise. The researches carried on nowadays in our professional laboratories have often an interest that is purely scientific, and we read so much of Compound Ethers, Organic Radicals, and Poly-Ammonias, that it is pleasant to find that one at least of our learned men has time to write a chapter on Soap and Water, or the science of the breakfast or dinner-table.

The author has divided his book into fourteen chapters, which are subdivided into numerous paragraphs, in addition to which there are rather long notes imparting information of a more purely scientific and technical character than that given in the body of the work.

'The Science of Home Life' deserves to be read in all schools professing to give a liberal education, and it also well merits the attention of the pharmaceutical student.

A Handbook of British Plants, designed especially for Schools, Science Classes, and Excursionists. By W. Lowndes Notcutt. London: Longman, Green, and Co. 1865.

After a careful examination of this little work, we regret we cannot recommend it to our readers.

BOOKS RECEIVED.

Observations on Hay-Fever, Hay-Asthma, or Summer-Catarrh. By W. Abbotts Smith, M.D.L. London: Robert Hardwicke, 192, Piccadilly. 1865. (Pamphlet.)

The Phenomena of Radiation, as exemplifying the wisdom and beneficence of God (Actonian Prize Essay). By George Warington, F.C.S. London: William Skeffington, 163, Piccadilly. 1865.

TO CORRESPONDENTS.

"*An Associate*" (Bristol).—*Ammoniated Solution of Quinine.* See vol. xiii. page 344.

J. K. (Gateshead).—The label would not render the article to which it refers liable to the Patent Medicine Stamp Duty.

Botanicus (Leeds).—We cannot recommend the work.

Student (Marylebone).—Bentley's 'Manual of Botany.'

W. J. E. (Wellington).—We are not acquainted with the preparation called "Nervine Balsam."

"*Nescio*" wishes for a formula for "Glycerine and Lime Cream."

M. (Rochdale).—When the sale of Oxalic Acid cannot be avoided, as in the case referred to, every precaution as to labelling, etc., should be observed.

Mr. Wade is thanked for his communication.

W. B. (Brighton).—This Journal is not the proper medium for such appeals.

Erratum.—Page 643, line 13 from bottom, *for* "mixed and diffused" *read* "mixed acid differed."

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.

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BETTS'S PATENT METALLIC CAPSULES.

NUMEROUS SUITS IN CHANCERY AGAINST RETAIL CHEMISTS AND OTHERS FOR SELLING ARTICLES CAPPED WITH METALLIC CAPSULES.

If anything was required to strengthen or confirm the opinions which for many years past have been frequently expressed by high authorities of the questionable advantages, if not the decided evils, resulting from the operation of the laws relating to patents, it has been amply supplied by the proceedings recently adopted by Mr. Betts with reference to the sale of articles capped with metallic capsules. The public have long become familiar with the name of Betts in the reports of proceedings in the law courts, and lawyers have benefited by these proceedings to the extent probably of £50,000, or more. Mr. Betts occupies the proud position of the discoverer and patentee of a combination of metals which has been successfully used for capping bottles, and in establishing his exclusive right to this distinction he says he has spent between twenty and thirty thousand pounds. His father, Mr. John Thomas Betts, so long ago as 1843, took out a patent for the manufacture of metallic covers or capsules for bottles and other vessels, but the metal used under that patent was tin, such as is contained in tinfoil. Those tin capsules were then, and have been since extensively used both in this country and abroad; indeed, the patentee acknowledged that the subject of his patent had been communicated to him by a foreigner. In 1849, Mr. William Betts, the son, discovered, applied, and patented an improvement in the manufacture, which consisted in substituting for tin a combination of tin and lead. This patent bears date the 13th day of January, 1849, and the specification states—

"The capsules herein referred to are metal covers, used for closing or stopping, or for securing the closure or stoppering of the mouths of bottles and certain other vessels, which metal covers have been hitherto made of tin, by bending up a suitable piece of a thin sheet of that metal into a hollow form, or cup, or cap, of a suitable size for applying closely over the mouth of a bottle or other vessel (and over any such cork or other kind of stopper as may have been previously inserted into the said mouth. In case of a cork or other stopper being used, the sides of the said metal cover, cap, or capsule also reaching downwards around the outside of the upper part of the neck of the bottle, so as to envelope the whole of such upper part, in the manner of an inverted cup, or of a case, or hood, or cap, or metal cover, or capsule, the said sides hereof, after having been so applied over and around the said upper part, are closely collapsed or closed in, or compressed laterally on all sides around that said upper part, in such manner as that the said metal cover, cap, or capsule will become securely fastened around and upon the said upper part, suitably for closing or stopping, or for securing the previous closure or stoppering of the said mouth of the bottle or other vessel, in such manner as that the said mouth cannot be opened without cutting or tearing the metal, and manifestly disfiguring the metal cover, cap, or capsule. Metal covers, caps, or capsules, made of tin, are well known under the designation of 'Betts's Patent Capsules,' and are now in common use, great numbers having been made and sold under certain letters patent, granted at three several times by Her present Majesty to my late father, John Thomas Betts, namely, on the eleventh day of August, one thousand eight hundred and forty-two, and on the sixteenth day of March, one thousand eight hundred and forty-three, and on the twenty-seventh day of June, one thousand eight hundred and forty-three. The new manufacture of a material to be employed in the manufacture of capsules, and for other purposes, consists in combining lead with tin, by covering the lead with tin over one or both surfaces of the lead, and reducing the two metals in their conjoined state into thin sheets, of a thickness suitable for the purposes to which they are to be applied. And for the purpose of so preparing lead by covering the same with tin as aforesaid, I first cast the molten lead in an ingot mould of cast iron (or other suitable material), and constructed in the usual manner of ingot moulds for metal, and of suitable internal dimensions for producing ingots of lead, which (for the manufacture of the material for capsules) may be between four and five inches wide by about three-quarters of an inch thick, and about thirty inches in length, with a few inches at one end of each ingot gradually reduced in thickness, in the manner of a wedge. I also cast tin, either into similar ingots, of the same or nearly the same dimensions as the aforesaid ingots of lead, or the tin may be cast into long thin strips, of nearly the same width as the aforesaid ingots of lead, and between one-quarter and one-sixteenth of an inch in thickness, and several feet in length. And having thus obtained the lead and the tin in suitable states for beginning the rolling or laminating each of the two metals separately between a pair or pairs of revolving cylindrical flatting-rollers, of the construction usually employed for rolling or laminating ductile metals, I pass and repass the lead one or more time or times through or between such rollers, that is to say, rolling and re-rolling the ingot of lead as many times as may be requisite for reducing the lead to about one-fourth of an inch in thickness, and thereby the ingot of lead will become greatly elongated. And in like manner I roll and re-roll the tin as many times as (according to its original thickness when cast as aforesaid) may be requisite for reducing it to about one twentieth part of the thickness to which the lead is reduced by rolling as aforesaid, whatever that thickness may be. The lead and the tin having been thus reduced to their proper relative thicknesses, and their widths being nearly alike, and even surfaces of each of the two metals having been obtained by the aforesaid rolling, then, in case it is intended to cover both sides of the lead with tin, I extend a long strip of the thin tin (so reduced to relative thickness as aforesaid) flatways upon a smooth table, and lay a shorter strip of the lead (so reduced to relative thickness, as aforesaid) very evenly upon the extended tin, with one end of the said strip of lead conforming with one end of the said long strip of tin, and then I fold back the tin over the other end of the lead (being that end thereof which still retains some of that wedge-like form of the original casting of the ingot of lead already mentioned), and, consequently, the tin when so folded will apply to both surfaces of the lead; I then cut off the long strip of folded tin to correspond with the length of the lead, and I smooth down the tin with any convenient wooden rubber, or otherwise, so as to take out all wrinkles in the tin, and bring it very evenly into superficial contact with the lead, and with the two bordered edges of the strip of tin, conforming everywhere with the two border edges of the lead, so as to ensure that the tin shall cover the lead as completely as can be done; I then take up the lead and tin together from off the said table, and present the folded end of the tin to a pair of revolving flatting-rollers, which are set so as to subject the two metals to a very considerable pressure, and that pressure, at the same time that it reduces the thickness and elongates the two metals, will also cause their surfaces to adhere together, and then I repass the conjoined metal again and again between the said rollers for further reduction and elongation, and at every succeeding time of so repassing the adhesion of the two metals will become more complete, and when the strip of conjoined metals is thus become elongated to a considerable length, I find it is convenient, for further repetitions of the rolling, to gather up the said strip (as fast as it comes out from between the said pair of flatting rollers) into a spiral coil, by means of a roller which is suitably disposed behind that pair of rollers, and is turned round by an endless strap motion, so as that the said roller will wind and coil up the strip around it into such a coil; and then that roller, with the said coil thereon, can be removed to the front of another pair of flatting-rollers, which by their motion will draw off and unwind the strip from its said spiral coil as fast as the conjoined metal passes through between the said flatting-rollers, which rollers should be made of hard cast-iron, in the manner of what are called chilled rolls, and highly polished, in order to give a very smooth surface to the tin of the conjoined metals by the rolling or flattening action of the said pair of flatting-rollers. And note, I provide a small cistern of water beneath the said roller which has the said coil around it, so that when the same is removed to the front of the pair of flatting-rollers, as aforesaid, the lower part of such coil will be immersed in the said water, in order that the conjoined metal may become wetted on its surfaces before it enters between the said pair of flatting-rollers; and such wetting tends to prevent the tin on the surface of the conjoined metal from adhering to the rollers, as it might otherwise do occasionally. And I repeat such rolling of the strip of conjoined metals between the same or another like pair of chilled and highly polished flatting-rollers, two, three, or more times, as may be requisite for reducing the said strip of conjoined metals to the required thinness. For the manufacture of capsules, the material so prepared is cut into disks or pieces of the required size. These disks are then carefully examined, for the purpose of rejecting any in which the lead is not perfectly covered by the tin, which will be at once discovered in a good light, from the difference of appearance of the surface where the lead is not perfectly covered. The disks of the said new material are made into capsules, and the manufacture thereof conducted in the manner described in the specification of the said letters patent of the sixteenth day of March, one thousand eight hundred and forty-three, and which process is now well understood."

The claims made under the patent are,—

"Firstly, the manufacture of the new material, lead combined with tin, on one or both of its surfaces, by rolling or other mechanical pressure, as herein described.

"Secondly, the manufacture of capsules of the new material of lead and tin combined by mechanical pressure, as herein described."

This patent would have expired on the 13th day of January, 1863; but in the preceding month of December, 1862, Mr. Betts obtained an extension to the duration of his patent right for an additional five years, which was granted principally on the ground of the great expense to which he had been put in establishing by litigation the validity of his patent, and the powers he claimed under it. Not only, it would appear, have differences of opinion existed among practical men on these points, but even the highest judicial tribunals have been at issue upon some of the questions submitted to them, and it has only been recently that the patentee has fully established his position.

While the subject continued under litigation, with decisions in the law courts at variance with each other, and doubts still hanging over the original patent, it is not to be wondered at that there should have been rival processes before the public for accomplishing the same object; and when at last Mr. Betts, by dint of great perseverance, backed by a heavy purse, succeeded in reducing his assailants to submission, he found the market stocked with capsules, many of which were infringements of his patent.

The final decision of the law courts has been entirely in Mr. Betts's favour. The validity of his patent has been established, and the competitive processes have been adjudged to be infringements; he has either stopped, or has the power of stopping, every opposing manufacturer in this country, and he can prevent the importation of foreign capsules made by his process. He has thus at last obtained a complete monopoly of the home trade for the remainder of his term, and with this it might have been thought he would be satisfied.

It is alleged that so great is the advantage resulting from the use of lead with a mere film of tin over its surface, as specified in the patent, that the manufacture of capsules from tin alone, which is now free to the public, is entirely or almost entirely superseded. Even abroad, where until recently tin capsules have been extensively used, they are now superseded by those made of the mixed metal.

But notwithstanding the advantages of Mr. Betts's process, he states that up to the present time he has been a great loser by his patent, in consequence principally of the heavy law expenses incurred. We believe he estimates his loss altogether at more than £30,000, and he naturally feels aggrieved at having been put to this expense, most of which has been incurred in establishing what is now proved to have been his right. He is fairly entitled to avail himself of the monopoly now conceded to him for the remaining two years and a half that his patent has to run; and if he had been satisfied with this, looking to the patronage of the public for the means of retrieving his losses, we feel assured that retail dealers in capsuled articles would have contributed in promoting his interests in this way. But the money that has been squandered in law, or otherwise lost in establishing the exclusive right to make and sell these capsules, amounts to a very large sum, while the further continuance of the monopoly is very brief, and there may well be some doubts of the possibility by the fair profits of trade, of making the balance in favour of the patent. There must be a great many capsules made and sold to give a profit of £30,000 in two years and a half.

Mr. Betts seems to think that where there has been a wrong there ought to be a right, and he thinks he has been wronged in the loss of £30,000.

Until recently, the law proceedings instituted by Mr. Betts have been directed against what may be called great offenders, men who have been manufacturers of capsules by processes which have proved to be infringements of the patent, or who have used such capsules in the way of business, knowing them to have been so produced. Many of these cases have been compromised by the payment of sums of money to stop further proceedings. Still, all this, no doubt, leaves a heavy balance to the bad, and wholesale offenders being limited in number, other means of covering losses must be sought for.

Within the last two or three weeks, proceedings have been commenced against retail dealers. On or about the 10th of July, no less than twenty-three chemists and perfumers, in different parts of London, received copies of the following letter, which was similarly worded in each case:—

London, 11, *Cannon Street West, July* 10, 1865.

Sir,—I am instructed by Mr. William Betts, of Wharf Road, City Road, Patent Metallic Capsule Manufacturer, to commence proceedings against you for an infringement of his patent, by the use and sale of metallic capsules on bottles, which capsules have not been made by him, but of precisely similar materials. It would be idle to assume, after the number of years that the capsules made by the patentee have been before the public, and the protracted litigation in the law courts in respect thereof, that you can be ignorant of the decisions of the Judges in favour of the patentee; and as recently as the 2nd of June last, it may be found, on reference to the 'Times' newspaper of the following day, that an Injunction was granted by his Honour the Vice-Chancellor Sir Wm. Page Wood, in the case Betts *v.* Neilson, restraining the use in England of foreign-made capsules. Notwithstanding these repeated decisions, the use of capsules, made in infringement of the patentee's, has steadily increased, and there is no other mode of endeavouring to stop the use of them, and obtaining compensation in damages, than by proceedings in Chancery, which the patentee has determined to take against all infringers.

I remain, your obedient servant,

F. Kent.

P.S. The case of Betts *v.* Neilson came on, upon appeal to the Lords Justices, on Friday and Saturday last, and was dismissed, as may be seen on reference to the newspapers.

Immediately after the issue of these letters, namely, on the 12th of July, bills were filed in the Court of Chancery, which were served on the next succeeding day, so that virtually no time was allowed for any explanation to be offered or for anything to be done to avert these proceedings. Defendants in these actions are mostly retail chemists and druggists, who do not use or deal in metallic capsules in any other way than by retailing certain articles, such as Price's Glycerine, Burnett's Disinfecting Fluid, Rimmel's Toilet Vinegar, and a few other articles of that description. They were not aware that any of the capsules, attached to these articles, were made or sold illegally. They found, on making a close examination of such capsules, that some of them bore the name of Mr. Betts as patentee, while others did not, but the name, where present, was so small and often so illegible, from its being nearly obliterated, that it was difficult, and sometimes impossible to distinguish it, even with the use of a magnifying glass. It was found that the capsules attached to Burnett's Fluid had no maker's name on them; yet it was asserted, by the agent supplying the fluid, that these were Betts's capsules, a fact subsequently admitted by Mr. Betts himself. Some capsuled articles, such as Rimmel's Toilet Vinegar, Vichy Water, etc., were capped with foreign capsules; and although these all bore a similar appearance, on submitting them to chemical examination it was found, that while some of them were composed of lead and tin, and were no doubt made by Mr. Betts's process, others were composed of tin alone, and did not therefore in any way interfere with the patent. The letter sent by Mr. Betts's solicitor, and the Chancery process which immediately followed it, gave no information as to the exact nature of the offence alleged to have been committed. Each defendant was left to speculate on this point, but, in most cases, it was thought the proceedings had reference principally to the sale of Rimmel's Toilet Vinegar, for Mr. Rimmel himself was similarly proceeded against with reference to this article. Mr. Rimmel was using French capsules, and he states that these, when he first commenced the use of them, were made of pure tin, but that latterly, since Betts's patent has expired in that country, they have been made of the mixed metal, and this change was made without his knowledge.

When the defendants to these suits became acquainted with the fact of so many of their brethren being similarly assailed, mutual conferences took place, and as several of the parties implicated were members of the Pharmaceutical Society, the advice and assistance of the Council and officers of the Society were sought and promptly rendered. The President, Vice-President, and Secretary of the Society took immediate steps to ascertain, as far as possible, all the bearings of the case, and finding that the retail dealers, against whom proceedings had been taken, were entirely ignorant of the fact of any of the capsules attached to articles sold by them having been illegally used, or being an infringement of Mr. Betts's patent,—while all the articles with capsules to them were plainly labelled with the names of the parties by whom the capsules had been applied, and who alone had the means of knowing whose capsules they were,—considered that these defendants were innocent of any intentional violation of the law, and that a simple explanation of these circumstances would satisfy Mr. Betts, to whom the means were in every case afforded to enable him to proceed against those who had knowingly infringed his patent. The case also appeared to be simplified by the announcement by Mr. Rimmel that he had offered to compromise with Mr. Betts by the payment of £1000 in lieu of all damages to which the plaintiff might be entitled, on account of the foreign capsules made of Betts's metal, which he had used, and supplied on capsuled articles to his customers. Several meetings of defendants in these suits, and others who were interested in the facts and principles involved, took place at the house of the Society in Bloomsbury Square; the opinion and advice of the solicitors to the Society were obtained; and a deputation was appointed to confer with Mr. Betts on the subject.

Previous to this, however, one or two of the defendants, acting individually, had induced Mr. Betts's solicitor to stop further proceedings against them on the payment of sums of money. In one case a widow, fearing the consequences of further law proceedings, was glad to compromise her case by the payment of £16, although she had never gained as many pence by the capsules she had innocently sold attached to some proprietary articles. In another case, double that sum was paid under similar circumstances. At the conferences that took place in Bloomsbury Square, the defendants were advised not to settle their cases in this way. It was confidently anticipated that Mr. Betts, on learning the circumstances of the case, as an honest man, would put a stop to such vexatious proceedings, and, whatever measures he might cause to be adopted against those who, with a guilty knowledge, had infringed his patent, that he would be anxious to relieve from further expense and annoyance the mere retail dealers in capsuled articles who had never knowingly offended nor practically benefited by the offence. The deputation had a long interview with Mr. Betts and the manager of his factory, Mr. Cheeseman, but they were greatly disappointed in the result, which was, that Mr. Betts refused to withdraw proceedings against any of the defendants, unless they consented to condone by the payment in each case of a sum of money. In fact it was evident, from what passed at this interview, that Mr. Betts's object was not the prevention of the infringement of his patent, but the recovery of the money he had already lost, by levying contributions from all those who, either knowingly or in ignorance, had rendered themselves subject to legal proceedings. Members of the deputation who had previously been disposed to support Mr. Betts in the vindication of his rights were, together with all who became acquainted with the result, highly incensed at the disposition he had manifested.

Mr. Betts having a patent of questionable validity, which had been under litigation for many years, with various results, the Court of Queen's Bench and the Court of Exchequer Chamber having pronounced it invalid, and its validity at last being only affirmed by an appeal to the House of Lords,—having spent or lost £30,000 in these and similar proceedings, he now seeks to reimburse himself by adopting wholesale proceedings against innocent traders who have unwittingly been led into an infraction not of the spirit but of the letter of the law.

Any man may lawfully make, and many do make, metallic capsules which cannot be distinguished in appearance from those made under Mr. Betts's patent, especially as Mr. Betts supplies many of his capsules without any distinguishing mark; and therefore dealers in capsuled articles have no means of ascertaining whether the capsules attached to such articles are of Mr. Betts's manufacture or not. Is it to be tolerated, that a litigious patentee should levy "black mail" upon the public, by first issuing patented goods with no sufficient means of distinguishing them from others with which they are brought into competition, then allowing infringers of his patent to stock the market with spurious articles made in imitation of his, and finally frightening the innocent possessors of these latter articles into the payment of large sums of money, by threatening them with expensive, if not ruinous, suits in Chancery? There are men who spend all their means in a succession of law-suits, and who enjoy the luxury of this kind of excitement, but this is an idiosyncrasy which is not common among members of the drug-trade. Many an honest man would pay a moderate sum, which he felt to be unjustly exacted, rather than get involved in a Chancery suit. But when Chancery suits are instituted by wholesale against innocent men, it becomes necessary, in the interests of the public, to put a stop to such proceedings.

When it was found that Mr. Betts and his lawyer were serious in their intention to recover damages or composition-money from all the defendants in the suits instituted, and that in all probability other suits would be commenced,—for there were obviously thousands of honest tradesmen equally implicated,—it was decided that the defendants in these suits should offer such resistance to the proceedings as the interests of commerce and the public might be thought to require.

Messrs. Flux and Argles, the Solicitors to the Pharmaceutical Society, were employed by most of the defendants to put in an appearance on their behalf, and a Committee, consisting not only of defendants, but of others who felt that they were liable to become such, was appointed; a circular was also issued by the Secretary of the Pharmaceutical Society to the members throughout the country, cautioning them against the sale of capsules not known to be of Betts's manufacture, accompanied by a letter from the Society's Solicitors, Messrs. Flux and Argles, in which they virtually say, that the only security against the annoyance of suit must consist in the removal of metallic capsules from all articles at present in stock to which they are attached, and a refusal in future to receive any capsuled articles into stock. In addition to these proceedings, it has been thought advisable to convene a public meeting of all traders dealing in any capsuled articles, such meeting to be held in the City of London, for the purpose of publicly discussing the steps that should be taken with reference to it.

Mr. Betts should weigh well the natural results of his proceedings if pushed harshly to extremities. In our opinion, such proceedings will only lead manufacturers to consider whether they cannot do without metallic capsules, and retail dealers to adopt the safe course of not selling any capsuled articles,—illustrating the fable of the goose and the golden eggs, and adding another to the many arguments against patented monopolies.

THE BENEVOLENT FUND.—A CHALLENGE.

In the January number of this Journal the revised regulations for the administration of the Benevolent Fund were given to our readers. It will have been observed that, in regard to *urgent* claims, the Council had resolved to devote once in every year a sum of money for providing a home in one of the orphan asylums for the destitute child of a deceased member.

It is our pleasing duty to record the first exercise of this benevolent and most judicious determination. At the very formation of our Society, the late Mr. Wm. Bentley, of Bethnal Green, London, became a cordial adherent. Through good report and evil report, though with very slender finances, he continued to support our Society by the payment of his membership fee to the year 1864, when the death of himself and his wife left four parentless children (a boy and three girls) without a home. They were received, indeed, promptly and cheerfully by their maternal grandmother, by whose energetic industry they have, up to this time, been maintained,—her earnings, however, being manifestly inadequate to make any due or certain provision for their subsistence and education.

The notification in this Journal of the willingness of the Council thus to provide a home by purchase in a case of urgency was brought under the notice of an eminent and kind-hearted solicitor who had interested himself on behalf of this little family, and who, in consequence, applied to the Council on the subject. His communication was promptly responded to, the merits of the appeal narrowly investigated, and the result a unanimous vote by the Council of *One Hundred Guineas* towards the necessary entrance-fee for placing a boy some nine years old in the British Orphan Asylum. The rest of the fee was subscribed by members of the Council, and the little fellow is now an inmate of this valuable charity. Under such circumstances, that the Pharmaceutical

Society had a fund available, must be a matter of scarcely less pleasure to those who have contributed to that fund than of thankfulness to those who receive its benefits.

We are pleased to be able to add that a home for two of the three little girls has been found in the institution called King Edward's School. One little girl is yet unprovided for.

A combination of circumstances, moreover, has, in fact, on this occasion, doubled the good which the Council contemplated in voting the grant. The orphan Bentley had previously been a candidate for admission to the Asylum at Slough; he had polled only sixty votes on the first election, and was coming to the second with a very small addition, hopeless of success. There was on the list of candidates another orphan, Ralph S. Walton, left unprovided for by his father, a late member of our Society, and his election seemed as far off as Bentley's, by the usual course. The purchase of one child's admission left the votes promised to him available for the other; and we are sure of the cordial sympathy of our readers when we inform them, that the liberality shown by the Council in the former case elicited such influential support from leading voters, more especially from the member of the legal profession before referred to, that the election of our second candidate was also secured.

The importance of sustaining the Council in their desire to render the resources of the Benevolent Fund promptly available for fit recipients, will, we are sure, be generally felt, after the instances here cited. With the view of augmenting the Fund, one of the members of our Society has offered to pledge himself to collect five guineas yearly for three ensuing years, *if* 199 *other members will do the same.* He has also handed in the names of several to whom he has spoken on the subject, who are willing to rank among these 200 workers. At his request we make public this challenge, and invite those willing to cooperate to communicate with the Secretary.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *5th July*, 1865,

Present—Messrs. Bird, Bottle, Davenport, Deane, George Edwards, Evans, Hanbury, Hills, Morson, Orridge, Sandford, and Squire.

The following were elected

MEMBERS.

Barret, Edward Louis....................................London.
Cameron, William ....Kelso, N. B.
Davies, Moses Prosser...................................Tenby.
Linford, John Samuel ....Canterbury.

The following having paid their arrears were restored to

MEMBERSHIP.

Crocker, Edwin ....London.
Gerrard, Joseph ....Etruria.
Rawle, William ....Melbourne.
Watson, Richard Thomas ....Jarrow.

BENEVOLENT FUND.

A grant of one hundred guineas was voted for the purpose of purchasing an admission for one of the orphan children of the late William Bentley, of Bethnal Green, member of the Society, into one of the Orphan Asylums.

EXAMINATION, 12*th July*, 1865.

(Registered as Pharmaceutical Chemists.)

Bindloss, George Frederick ....London.
Oliver, Josiah ....Hadlow.
Stevenson, Wm. Law ....London.
Swift, Francis ....Spalding.

EXAMINATIONS, 19*th and* 26*th July*.

MAJOR (Registered as Pharmaceutical Chemists).

Amoore, Charles Robert..............................Hastings.
Brough, Henry James ....Windsor.
Clayton, Francis Corder ....Leeds.
Cox, Samuel Goodhall ....Leicester.
Dawson, Oliver Robert ....Southampton.
Fitt, Francis E. ....Barking.
Harris, Henry William ....Reading.
Hitchcock, Arthur William ....Oxford.
Oldfield, Frank ....Dover.
Payne, Martin Henry.................................Bridgewater.
Tanner, Alfred ....Lewes.
Thomas, John Ashlin.................................Harrogate.
Watson, James ....Mauritius.
Whysall, William ....Belper.

MINOR (Registered as Assistants).

Dyer, William Andrew ....Corfe Castle, Dorset.
Dyson, Walter ....Pendleton.
Gardner, Austen Walter ....Canterbury.
Green, James Samuel.................................Braintree.
Hanson, Thomas......................................Tamworth.
Hughes, James ....Jamaica.
Hunter, Charles Miller ....Durham.
Knight, Henry ....London.
Postans, Arthur William ....Bury St. Edmunds.
Pratt, Joseph ....Stratford-on-Avon.
Towerzey, Alexander.................................London.
Wilson, John Henry ....Great Driffield.
Windle, William Frederick ....London.

REGISTERED APPRENTICES.

NAME.	RESIDING WITH.	ADDRESS.
Pedler, Alexander	Mr. Pedler	London.
Roberts, William Frederick	Mr. Roberts	Gibraltar.
Robertson, Frederick P. M.	Mr. Matthews	London.
Thompson, William Milner	Mr Thompson	Thirsk.

ERRATA.

Page xiv, line 6, *omit* No. 402.
" xiv, line 7, *add* No. 402.
" xliv, *omit* Sargent, George W., Liskeard.
" xlvii, *add* 1862 | 792 | Pritchard, Urban...London.
" xlviii, *add* 1864 | 856 | Sargent, G. W....Liskeard.
" lii, line 32, *for* Constance, *read* Pollock.

ORIGINAL AND EXTRACTED ARTICLES.

THEBOLACTIC ACID.

BY MESSRS. T. AND H. SMITH.

As it has been remarked that we have never published the process for obtaining Thebolactic Acid, may we take the liberty of submitting to you the process here embodied, which at the first we printed, circulated, and supplied to the jurors of the International Exhibition of 1862, when the thebolactic acid was first publicly exhibited? We feel called upon to take this step by seeing in the 'Dictionary of Chemistry' (by Watts), now publishing, Thebolactic Acid (under the head "Opium") classed as one of the doubtful constituents of Opium, and Dr. Thomas Anderson, Professor of Chemistry, made responsible for that doubtful character. In a paper read by Dr. Anderson at the Chemical Society on the 1st May, 1862, and published in the Journal of the Chemical Society, thebolactic acid is ranked as one of the "well-determined" constituents of opium; and in a letter we just have from him, he says, "I have never entertained any doubt as to your having extracted from it (opium) an acid which Stenhouse found to have the same composition as lactic acid."

The ready crystallizability of the salt of lime gives the means of obtaining the thebolactic acid from opium.

After all the alkaloids have been thrown down by an alkali from the impure mother-liquids of morphia, the concentrated liquid is digested with levigated litharge at a heat of about 140° Fahr., with frequent stirring.

The thinned and filtered liquid, having been then concentrated to a thick consistency, is mixed up with a large quantity of S. V. R. From the filtered spirituous liquid the bases are carefully thrown down as sulphates by the addition of sulphuric acid (of which, to do this, a large quantity is necessary). The filtered liquid, after careful neutralization with milk of lime, is distilled to recover the spirit.

On the contents of the still being then brought to a syrupy consistence, and laid aside for a week or so, the syrupy liquid sets into a crystalline mass of thebolactate of lime.

Having obtained the lime salt, it is easily purified by repeated crystallization and the use of charcoal. After bringing the salt to a snowy whiteness the acid can then, by the addition of the equivalent quantity of sulphuric acid and the use of S. V. R., or other obvious means, be obtained in a separate state.

From the unvarying occurrence of this acid in opium, and its abundance, there cannot be any more doubt of its pre-existence there than of meconic acid, codeia, thebeia, or morphia itself. Since its discovery, the general yield from Turkey opium of the thebolactate of lime has been about two per cent.

The circumstance of the quantity of meconic acid obtained from opium being decidedly less than corresponds to the morphia and other organic bases, is a strong argument in itself for the pre-existence of thebolactic acid, and from this conviction arose the search for, and discovery of, this new acid in opium.

Though we have some reason to think Mr. Watts rather loose, our object here is not to complain, but to draw attention to an interesting matter.

Our belief that thebolactic acid exists as a constituent ingredient of opium is founded on the fact that it was separated from at least twenty different consignments of opium of different seasons, and that the yield was uniform, and, as nearly as could be judged, invariable in quantity. Altogether we prepared about one hundredweight of thebolactate of lime, most of which we purified to a snowy whiteness.

Dr. Anderson, in his present letter to us, says—"I think further evidence is required to show that thebolactic acid is really isomeric, and not identical, with lactic acid. So far as I recollect, Stenhouse merely determined the constitution of the acid, and did not make such a comparison of its salts with those of the ordinary lactic as seems necessary to establish this point in a thoroughly satisfactory manner. We now know two kinds of that acid, the common variety, and sarcolactic acid, and if you clearly showed that thebolactic acid is a third, it would be a matter of the greatest interest, and would well repay the labour it requires."

While Mr. Watts, in his Dictionary, says—"Anderson was not able to detect the existence of thebolactic acid in opium," Anderson says—"In my investigations of opium I have not *attempted* to prepare thebolactic acid, but have confined my attention entirely to the basic constituents of opium."

We could not object to any one doubting that thebolactic acid was not the result of change in the juice of the poppy after exudation or during manipulation, in the manufacture of morphia and other principles, any more than we could object to such a view in regard to meconic acid; but we think that until the natural existence originally of these acids is disproved, it is fair to hold them as "*well determined*" constituents. We would feel obliged to any one throwing more light on the matter, even if they proved the non-existence, naturally or originally, of thebolactic acid in opium.

MEMORANDA ON SOME FORMULÆ IN THE BRITISH PHARMACOPŒIA.

BY DANIEL HANBURY.

In the formula for preparing *Mistura Ferri composita*, a few small alterations suggested by experience appear worthy of notice, and although attention has already been drawn to one of them, the moment seems opportune for again referring to the subject.

The first point I would notice is the *Myrrh*, which (as often stated) should not be *in powder*, as the long desiccation required for reducing it to that state deprives it of much of its aroma. A piece of fine lump myrrh answers better: there is, moreover, an advantage in allowing the myrrh to soften by contact with the water during some hours, before the emulsion is completed. This emulsion is usually kept ready prepared, the sulphate of iron being added when the mixture is required to be sent out. As no chemist would probably prepare for stock less than a pint of it, I would adapt the formula to that quantity. According to the British Pharmacopœia, each fluid ounce of the emulsion requires $3\frac{3}{4}$ grains of sulphate of iron: it would be rather more convenient to reduce this proportion to $3\frac{1}{2}$ grains to the ounce, the mixture of the London Pharmacopœia being $2\frac{1}{2}$ grains.

With these changes, the following would be the formula for

MISTURA FERRI COMPOSITA.

℞ Ferri sulphat. grs. 70.
Potas. carb. grs. 60.
Myrrhæ,
Sacch. āā drms. $2\frac{1}{2}$.
Sp. myrist. fl. drms. $2\frac{1}{2}$.
Aq. rosæ, q. s.

Triturate the myrrh and carbonate of potash with the sugar and sufficient rose water to form a thin paste. Set this aside for twelve hours; then continue the trituration, gradually adding rose water and the spirit of nutmeg, so as to form 20 fluid ounces of an uniform emulsion, which preserve. When required for use, add the sulphate of iron in the proportion of $3\frac{1}{2}$ grains to each fluid ounce.

The next formula respecting which I would offer a few words, is that for *Mucilago Tragacanthæ*. This preparation is rarely wanted, and never, I believe, kept ready prepared. It is, moreover, much too thick, and twenty-four hours is a longer time than can generally be allowed for preparing it. If a mucilage containing tragacanth only is required, which in the presence of so convenient a preparation as the Compound Powder is very questionable, the following formula will be found to afford a good result.

MUCILAGO TRAGACANTHÆ.

℞ Gum. tragacanth. pulv. grs. 60.
Aq. dest. fluid ounces 10.

To the water contained in a pint bottle, add the tragacanth, agitate briskly for a few minutes and again at intervals until the gum be perfectly diffused, which will occur in about five or six hours.

PHARMACY AT THE DUBLIN EXHIBITION.

There is perhaps no other art which is not better represented in the International Exhibition, now open at Dublin, than that to the interests of which the pages of the 'Pharmaceutical Journal' are devoted. This is, I think, readily explained by the fact that the London Exhibition of 1862 gave to the manufacturers of chemical preparations, all that could be desired in the way of publicity, while the extensive display organized under the auspices of the Pharmaceutical Society, left little to be done in that of illustrating the position which Pharmacy now occupies. Then, again, the very products which generally excite the greatest interest, are, for the most part, not those which are representative or even new; but those which—like the codeia bowl of Messrs. Smith, of Edinburgh, or the mass of calomel of Messrs. May and Baker in the Exhibition of 1862—cost much trouble to prepare, and are not easily transported to a distance. Yet, there is the British Pharmacopœia with all its new—if not improved—preparations, which have as yet never been collectively illustrated. How comes it that no pharmaceutist has thought it worth the trouble to bring together a complete collection of these? Nevertheless there is—when one throws aside the catalogue and really seeks in earnest for matter, which, if not very closely connected with Pharmacy, yet has some bearing upon it—a great deal that is interesting and some that is novel. It must be understood that I speak now only of the British Department of the Exhibition, to which I propose to confine this notice. As far as I can judge from a very short ramble through the foreign courts, Pharmacy is much better represented in them than in the home section.

Perhaps the best idea of the way in which the medico-chemical art—if I may be permitted to coin a phrase—is represented on the part of the United Kingdom, will be obtained if I take from the Official Catalogue the few pithy notices which must be the key-words to all that I shall have to notice as far as Pharmacy, pure and simple, is concerned. It is always well to have a fixed plan, and to adhere to it as closely as may be. Having given this short list of the pharmaceutical exhibitors and the products which they exhibit, I propose first to speak of such specimens as appear to deserve notice, and then to describe such other objects in the Exhibition, as from their connection with chemistry and the allied sciences, or their own scientific interest, may not be considered out of place in these pages.

The order here followed is of course the alphabetical :—

Bewley and Draper, 23, *Mary Street, Dublin.* Pharmaceutical Products, Mineral Waters.

Bewley, Hamilton, and Co., *Sackville Street, Dublin.* Pharmaceutical Chemicals.

Boileau and Boyd, *Bride Street, Dublin.* Pharmaceutical Chemicals.

British Seaweed Company (Limited), *Whitecrook Chemical Works, Dalmuir, Dumbartonshire, N. B.* Series illustrating Stanford's Patent Method of Treating Seaweed.

Hirst, Brooke, and Tomlinson, *Bishopsgate Street, Leeds.* Acetic Acid and Acetates, Wood Naphtha, Artificial Essences, Chemical and Pharmaceutical Preparations.

Johnson, Matthey, and Co., *Hatton Garden, London.* Nitrate of. Silver, Caustic Sticks and Points, Platinum Apparatus, Magnesium, etc.

Johnson and Sons, *Basinghall Street, London.* Nitrate of Silver, Sticks and Points for Surgeons, Bismuth, Cadmium, Refined Antimony.

Price's Patent Candle Company, *Belmont Works, Battersea, London.* Pure Glycerine, Oils, Candle Material.

The case of Bewley and Draper, 23, Mary Street, Dublin (12), contains some preparations of the new Pharmacopœia; among others, *Extractum Opii Liquidum* and *Extractum Belæ Liquidum.* Some non-officinal preparations are also shown. There is *Vinum Ferri*, for example, rendered permanent by the addition of citrate of ammonia, *Liquor Taraxaci* and *Pepsine Wine.* This firm also exhibits well-granulated *Citrate of Magnesia*, and a large display of *Aërated Waters, Soda Water, Ginger Beer, Lemonade, Ginger Ale, Seltzer Water*, and *Lithia Water.* I may just mention, in connection with this very favourite way of administering the carbonate of lithia, that an aërated water containing a lithium salt may be most easily distinguished from one which does not by the spectroscope. The intensity of the lithium ray is so great that it is easily recognised even in the presence of a great excess of sodium, and the scarlet band is at once produced if a single drop of lithia water be introduced on a platinum wire into the flame of the Bunsen burner.

Bewley and Hamilton (40) exhibit a pretty extensive series of chemical preparations used in medicine, and some which are connected with photography. The specimen of *Iodide of Cadmium* and the *Bromide* of the same metal are very good. There is, however, a bottle labelled *Protophosphate of Iron*, the contents of which are a *green* powder. This appears to be somewhat anomalous, as well-prepared phosphate of the protoxide of iron is *blue.* In the same case are some other iron preparations which, although nicely scaled, are very different to those usually met with in commerce. The *Citrate of Iron and Quinine* is a marked example of this. Instead of the golden-coloured preparation which is usually seen now, we have here one which is *dark red.* This is, however, precisely similar in appearance to the product of the formula of the Pharmacopœia. The salt will do very well for dispensing purposes, but would be at once returned to any wholesale house which should venture to send it out. Is the golden colour due to the judicious use of *potash?* How far does it depend on the state of oxidation of the iron? Why does not the British Pharmaceutical Conference elicit information on these points, and how is it that the method of producing one of the most used and most valuable of the scaled preparations of iron still remains a trade secret? A glance at this series of preparations by Messrs. Bewley and Hamilton is by no means uninstructive, as showing how difficult it is for one manufacturer to succeed in producing a great variety of presentable chemical compounds. Here, side by side, are some which are very good and really pretty; others which are just the reverse. *Aloïne*, for example, is dirty-brown and amorphous, and not in the least like the aloïne of Messrs. Smith, of Edinburgh, which is in well-defined yellow crystals. *Iron Alum*

($Fe_2O_3,3SO_3 + NH_4O,SO_3 + 2HO$) is very good, in rose-coloured crystals; so is *Valerianate of Zinc.* Citrate of quinine, on the contrary, is of a dirty-brown, and looks as if it had been dried at too high a temperature; and *White Precipitate* sadly belies its name, and is brown also. On the whole, this series is good, and is, perhaps, better deserving of notice, since it represents a very large number of preparations in their every-day aspect, and not under the too often deceptive guise which is assumed by picked specimens. In the same case are *Aërated Mineral Waters* in two different forms of bottle, one the usual egg-shaped kind, and the other the convenient "siphon," which is so much used on the Continent.

Boileau and Boyd, Bride Street, Dublin (42A), exhibit a very fair show of chemicals, and the only specimens of *drugs* which the British section of the Exhibition contains. Among the latter are good samples of *Opium* (Levant) *East India Rhubarb Root* and *Sumbul. Castor Oil Seeds* also figure in this collection, probably because they are pretty, certainly not because they are used in medicine, or because castor oil is *not* drawn in Ireland. The chemical preparations in this case include specimens of *Aloïne* (in good crystals and of the proper colour). *Iodide of Iron* (this *dry*), *Salicine* (labelled Salacine), *Piperin*, *Chloride of Chromium*, and *Mannite.*

Certainly one of the most interesting cases in this part of the Exhibition is that of the British Seaweed Company (13). This company has been established in order to work the patent of Mr. Stanford, which is based upon a very important modification of the usual method of treating seaweed for iodine, bromine, and potash. The ordinary plan consists, as is well known, in incinerating the sun-dried seaweed in the open air. The fused residue, or "kelp," is then exhausted with water, and the different salts which constitute it separated by fractional crystallization. It has been observed that when seaweed is thus burned, a very large proportion of the iodine—on the average, a quantity nearly equal to the whole yield—is totally lost; much of the potash also is volatilized. In the process of Mr. Stanford this is avoided by carbonizing the seaweed in closed vessels at a comparatively low temperature, and then treating the charred product precisely as if it were kelp. This seems a very simple modification indeed, but it nevertheless is stated to completely fulfil the grand object of saving the iodine lost in the old process. Nor is this all. The vessels in which the charring process is conducted are *retorts*, and it therefore becomes one of destructive distillation, and the saving is not confined to the inorganic constituents, but is extended to a pretty large number of volatile organic products. Among these are *Acetic Acid*, *Tar*, and *Naphtha.* The series of specimens exhibited by the company includes the whole range of products which can be obtained by the judicious practice of the principles which have been laid down by Mr. Stanford. There appears to be no one of these which is not capable of being advantageously utilized; the residue from the washing of the charred weed is burned in the furnaces, and the very ash which then remains is said to be a valuable manure.

As I write, the workmen are busy in putting up a new case, in which the economical treatment of seaweed is to be further illustrated. A printed paper, which I have obtained in the Exhibition, states that the products which are to be shown are obtained under a patent of Messrs. Young and Glassford "for drying and incinerating seaweed." I cannot this month obtain any further information on the subject, but I incline from a perusal of the prospectus in question to the opinion that the method of these gentlemen is very closely allied to, if indeed it be not identical with, that of a Mr. Macardle, which caused some interest and not a little monetary speculation in Ireland a short time since.

Hirst, Brooke, and Tomlinson (20) show a very good series of products, which are interesting chiefly from the fact that they are nearly all more or less connected with the distillation of wood. They include *acetic acid* and *acetates*, pyroxylic spirit, *pear essence* (acetate of amyloxide), and pineapple and raspberry essences. It is to be regretted that Mr. Eschwege should not have shown here his purified wood spirit, which at the time of the London Exhibition of 1862 first attracted attention. The specimens there exhibited could not be said to illustrate a manufacture of any importance; they rather proved that wood spirit was really a fluid possessing *of itself* no marked taste or odour, and that both were due to the presence in the commercial article of oily hydrocarbons which could be separated by a peculiarly modified process of filtration through charcoal. Mr. Eschwege now conducts the purification of wood spirit on a very large scale, and can supply it in unlimited quantity. The specimens which I have lately examined are very much purer than that to which I drew attention in 1862.

The probability of this purified pyroxylic spirit being used as an adulterant of wine-alcohol is now so seriously apprehended by the excise authorities, that as the readers of the Journal know, a check is to be put upon its manufacture in the shape of a restrictive duty. Two years ago, the suggestion that it could be so employed was treated at the Somerset House laboratory with quiet contempt.

The presence of the "fruit essences" mentioned in the case of Messrs. Hirst and Company, reminds me that this manufacture, which may be said to have originated with the Exhibition of 1851, has, although it has attained considerable importance, not been enriched by any new organic compounds for a long time. Although nearly every fruit is now represented by an artificial essence, which more or less resembles its proper flavour, these are, for the most part, simply mixtures formed from two or more of a very small series of compound ethers, either with or without the addition of essential oils.

At the time of the 1862 Exhibition, Dr. Hofmann called attention to *suberic ether*, which has been pointed out by Mr. H. B. Condy to closely resemble in odour the *mulberry*. No new bodies of this class appear—at least not in the British department—in the Exhibition.

Messrs. Johnson and Matthey, whose names have become as closely associated with platinum as that of Mr. Sonstadt with magnesium, or that of the Messrs. Bell with aluminium, contribute an array of specimens of unrivalled excellence and beauty. This case is indeed the great attraction of the scientific part of the Exhibition, and as its proprietors have, with commendable forethought for the public convenience, placed within easy reach a very concise description of its contents, the latter have been honoured with more notices —newspaper and otherwise—than perhaps any other collection of manufactured products in the Exhibition. Passing over the platinum apparatus, which is, of course, chiefly that employed in the sulphuric acid manufacture, and an admirable show of analytical *desiderata*—among which a crucible of lustrous gold is particularly beautiful—and might almost excusably be coveted by a chemist—I may dwell for a moment on the illustrations of the newly-born *magnesium* industry. These, Messrs. Johnson and Matthey show, as agents for the "Magnesium Metal Company." First, there is a mass of the pure metal, weighing 134 ounces; then a solid magnesium casting—an obelisk 162 ounces in weight. The latter and a steam valve (why, by the way, choose to make a *steam valve* of so oxidizable a metal?) well demonstrate the ease with which magnesium is cast, and how well it adapts itself to the intricacies of the mould. Its low specific gravity and the process by which—though not ductile—it is pressed into wire, are simultaneously illustrated by a coil of wire rather more than a mile long, which does not quite weigh three pounds, and by another of ribbon which weighs but two and a half pounds, and measures 4800 feet. Both wire and ribbon are, of course, only used for the production of the "magnesium light." It has, by the way, been lately pointed out that a compound strand, consisting of one magnesium and one *zinc* wire gives a light of great brilliancy at, of course, less cost than if the alkali-metal alone is employed. This statement, however, requires confirmation.

I fear if I were to digress into the topics which each branch of the precious-metal industry, exemplified by Messrs. Johnson and Matthey, suggests, I should soon exhaust the space at my disposal. I must therefore content myself with enumerating such of the objects exhibited as are most interesting to myself, in the hope that my readers may agree with me.

The lightness of *Aluminium*, and the marked difference between its specific gravity and that of silver, are very strikingly illustrated by two bottles, one of which contains six leaves of the former, and the other six leaves of the latter metal. The silver weighs 22 grains, the aluminium 1 grain.

There is, on one of the shelves of the case, a saucer of *Platinum Black*, and, I suppose it was because I had never seen so much of the metal in this form before that the idea occurred to me, that with the aid of an ounce or two of platinum black, an apparatus might be easily constructed for oxidizing a sample of a preparation supposed to contain methyl-alcohol, and thus obtaining *formic acid*, the presence of which could be demonstrated by the method of Mr. Miller. The collection of the *rare metals* in this case is of especial interest. It comprises *Osmium* (alloy of osmium and iridium), *Tellurium*, *Rhodium*, *Ruthenium*, and *Palladium* (chloride, ammonio-chloride). There are also beautiful specimens of *Silicium* (this very like resublimed iodine), and *Boron* (just as closely resembling the iodine of commerce). If I stop for a moment to recall one or two other objects, with the mention of which, to conclude my hasty summary of this most fascinating case, I involuntarily conjure up the remembrance of the beautiful feathery crystals of the *Iodide* and *Bromide* of *Cadmium*, the splendid golden-yellow of the *Nitrate of Uranium*, and the gorgeous, diaphanous, vivid green of its *protosulphate*.

Johnson and Sons, Basinghall Street (22), show many of the pieces of platinum apparatus which are exhibited by their competitors. They have also some prettily-finished spoons, etc., for blowpipe analysis, *Cadmium* and *Bismuth* in ingot, (How is it, *par parenthèse*, that it is so difficult to obtain bismuth in commerce free from copper?) and tough-points of nitrate of silver, understood to be obtained by adding a little hydrochloric acid to the fused salt, and so contaminating it with a trace of chloride. The only novelty here is *Sulphate of Zinc Points*, prepared by fusion.

Palmam *qui meruit ferat*, might as appropriately be the motto of Price's Patent Candle Company as of the medal which it will doubtless obtain at the hands of the jury. When one remembers how comparatively short a time has elapsed since *palm oil* was considered to possess little or no commercial value, the progress which has been made in the practical applications of this substance becomes remarkably interesting. There are, I imagine, few readers of the 'Pharmaceutical Journal' who are not familiar with the process patented by Mr. Wilson, by which the oil is decomposed into its constituent fat acids and glycerine. Those who are not, may be reminded that this is done solely by the use of steam at a high temperature—"superheated," as it is called—and that the fat acids distil over together with the glycerine, but no longer chemically combined with it. To the pharmaceutist this process is of especial interest, as being the source of the first—as it is still the best—*pure* glycerine which was to be obtained in commerce, while it gives the candle maufacturer a series of fatty acids of a degree of purity before unexampled.

The specimens exhibited in the beautiful case of the Company (31, *nave*) almost exhaustively illustrate the technology of palm and cocoa-nut oils. With the former we have as a starting-point the *palm nuts* themselves, then *palm oil*, *palm-oleic acid*, and *palmitic acid*,—this last in crystalline masses of snowy whiteness. Let me stop here for a moment to point out that these beautiful fat acids—perfectly free from rancidity, and not prone to change; of constant composition and melting-point, and often brilliantly white—are too much neglected by the practical pharmaceutist. They are easily obtained in any required quantity, and are very cheap. I feel convinced that, ere long, alloys of one or other of them with either the fluid fat acids or with neutral oils will replace the changeable and unsatisfactory lard as bases of ointments. And the oleic acid of palm oil, unlike the oleic acid of tallow, is nearly scentless, and answers admirably for preparing *Oleum Morrhuæ cum Quinâ* by the method of Dr. Attfield.

I do not think that the beautiful specimens of *Glycerine*, which have so artistically been made to adorn this case, call for any especial notice. Here, however, is a practical fact. My friend Mr. Tichborne finds that Price's glycerine, as it comes into the market, has a specific gravity of 1·253, and that this density is scarcely increased by evaporation at 212° F. Many of the German glycerines range nearly as high as this, but I have never yet seen a specimen "equal to Price's in every respect," and although taking their very low cost into consideration, they are fairly good as a rule, I once met with some which was far from being so. It was in a cask: I think there was about fifteen gallons of it, and my attention being attracted by its great thickness, I was led to examine it, when it proved to be pure *sugar*. How it was made I have not the least idea, but I have never seen a more beautiful specimen of uncrystallizable glucose. The maker must have been somewhat of a philologist, for when taxed by the importer with the fraud, he took, I heard, the ingenious line of defence that as γλυκὺς meant "sweet," he was justified in selling sugar of fruit instead of sugar of fat!

Messrs. Price and Co. also exhibit *Cocoa-stearin*, *Cocoa-Stearic Acid*, and *Cocoa-Olein*.

Dublin. HARRY NAPIER DRAPER.

(To be continued.)

ON THE DETECTION OF PHOSPHORUS IN CASES OF POISONING.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Last year, Dr. W. Bird Herapath published a new mode of discovering phosphorus in cases of poisoning. It was said to be dependent upon two chemical principles—the first of which was, that nascent hydrogen would dissolve and combine with phosphorus either in the elementary state or in that lower state of acidity in which it exists after the element has been exposed to slow combustion; the second principle was, that such nascent hydrogen would not decompose phosphates.

The first principle has been acted on for many years in making spontaneously inflammable phosphuretted hydrogen with phosphorus, zinc and diluted sulphuric acid; it is, in fact, an extended application of Marsh's means of detecting arsenic, antimony, etc.; but it is with the second I have to do here. I thought that if the notion that phosphates were not decomposed by the process was *not* correct, it was impossible to say what mischief would be produced by its use in cases of suspected poisoning. I therefore commenced a set of experiments to prove or disprove the fact. I selected those phosphates which were most frequently found in animal matters. I began with pure well-burnt bone-earth; this I introduced into a tubulated retort with diluted hydrochloric acid and zinc; the gas produced was passed by means of a tube into a solution of ammoniacal nitrate of silver. In a few minutes the solution became black, and soon a black powder deposited, which, by chemical means, was rapidly converted into phosphoric acid and silver. This and the following experiments were made in a darkened room lighted only by gas. I followed the same process with "soluble phosphate," made by removing two equivalents of the lime by sulphuric acid; with hydrated phosphoric acid, made by nitric acid and phosphorus; with phosphorous acid, made by slow combustion; and triple phosphate, "microcosmic salt." I next tried whether the natural textures of which the phosphate of lime formed a part gave the same indications, and sent to the butcher for some washed sheep's intestines, and having cut some slips from them, went through the same process, and in every instance I produced the same black compound.

It is evident, therefore, that this mode of proceeding must not be resorted to again in cases of toxicological inquiry. It has already been adduced in two cases of suspected murder.

Your obedient servant,
WILLIAM HERAPATH, SEN., F.C.S., ETC.,
Professor of Chemistry and Toxicology, Bristol Medical School.

July 4th, 1865.

A DANGEROUS SUBSTITUTE FOR JALAP.

Some serious and fatal accidents have recently occurred at Constantinople through the root of Aconite having been mistaken for Jalap.

From what we can gather from the account of the occurrence given by Professor Dr. C. D. Schroff, of Vienna,* it would appear that a merchant at Constantinople received from Calcutta a parcel of a drug which he considered to be jalap, and which he sold as such to several apothecaries and druggists. This terrible error was soon followed by serious consequences. A fatal case of poisoning occurred, and suspicions having been aroused respecting the medicine which the patient had taken, the danger was traced to the supposed jalap. A further examination revealed the fact that this drug was in reality aconite root, and of that peculiarly poisonous variety which is known in India as *Bikh*, and which is commonly attributed to *Aconitum ferox*, Wall., although the roots of other species are also collected under the same name.

The confounding of drugs so little similar as jalap and aconite, seems, at first sight, to indicate extraordinary ignorance on the part of the purchasers. But we have found upon examination that some of the larger roots of the Indian aconite have a certain distant resemblance to the small and inferior jalap-tubers that have of late years appeared in the market. A very cursory examination, however, will immediately show their distinctness.

OBSERVATIONS ON SOME POINTS IN THE ANALYSIS OF POTABLE WATERS.

BY PROFESSOR W. A. MILLER, M.D., LL.D., PRES. CHEM. SOC., TREAS. AND V.P.R.S.

(1.) Although the analysis of potable waters is an operation which every chemist has frequently occasion to perform, it is remarkable that there is much less agreement between different operators in the exact mode of conducting the details of the analysis, and of reporting the results, than might have been expected. It is with the hope of contributing something towards facilitating greater uniformity in practice, and of adding precision to the results attained upon one or two important points, that I have been induced to bring the subject, trite as it may appear, before the Chemical Society on the present occasion.

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* Eine höchst gefährliche Verwechslung der Jalapawurzel, in *Zeitschrift des allgemeinen österreichischen Apotheker-Vereines*, 16 Juni, 1865.

I believe that much would be gained, both in precision and in the comparability of our results, by performing every detail in exactly the same way, time after time, as in the common methods of assaying. In such cases it is astonishing how closely the results obtained coincide with each other when the identical alloy is repeatedly subjected to the process by the operator, who may be, nevertheless, quite unconscious of the strictness of the ordeal which he is undergoing at the hands of the client who is testing the accuracy of his work. In a *résumé* of the nature of that which I am proposing to make on the present occasion, any great amount of novelty will not be expected. I have selected from every available source with which I am acquainted methods which, if not *minutely accurate* in the scientific sense of the word, experience has proved to be at least practically correct, and for the most part easy and rapid in performance.*

(2.) *Mode of observing Colour of a Water.*—After examining the *appearance* of the water in a beaker, a portion of it should be placed, as practised by Dr. Letheby, in a tube two feet in length and an inch or more in diameter, closed at the bottom with a flat plate of glass. A similar tube is filled with distilled water, and compared with the water under trial by placing the two tubes side by side, and looking down upon a white plate. The water usually has a shade of yellow, green, or brown, if organic impurity be present, and the amount of colour can then be estimated and may be noted in terms of an arbitrary scale.†

(3.) *The amount of sediment* held in suspension in a gallon or half a gallon, or say three or five litres, is determined by allowing the water to settle, drawing off the clear water with a siphon, collecting the sediment on a weighed filter, and drying at 284° (140° C.); and the loss by ignition is afterwards ascertained when the filter and its contents are burned, and the residue is weighed.

(4.) *The taste* of a water, as was pointed out by Dr. T. Clark, should be determined both at the ordinary temperature and when it has been warmed to between 86° and 95° (30° and 35° C.), at which point any unpleasant flavour is much more distinctly perceptible than when the water is cool.

(5.) *The odour* will also be developed under similar circumstances, and will become more marked if a little lime or baryta-water be added before warming the water. It may be best observed by placing a few ounces of the water in a flask partially filled, and drawing air through a tube from the upper part of the flask into one nostril, whilst the other is kept closed.

(6.) *The hardness of a water,* as determined by the soap-test of Dr. Clark, furnishes, of course, one of the most important data in relation to the fitness of such a water for domestic purposes; but all the particulars relating to the precautions needed to attain accuracy in this operation upon a water before it has been boiled have been so thoroughly worked out by Dr. T. Clark and Mr. D. Campbell, that I have nothing further to add. I may remark that in taking the hardness of a *boiled water*, a steady ebullition of not less than one hour should be maintained before determining the extent to which softening has been effected. The flask, of course, must contain a *weighed* quantity of water, and after the boiling the amount must be made up to the original weight by adding pure distilled water. A simple condenser, consisting of a tube about a third of an inch in diameter, four feet long, cut off obliquely below, and resting, by a bulb blown near its lower extremity, upon the neck of the flask, will reduce the loss by evaporation to an insignificant amount.

(7.) *Evaporation and Incineration.*—The most difficult, and at the same time most important problem in the analysis of a water is the determination of the amount of the *organic matter*, as it is loosely termed, which it holds in solution. The plan, often practised, of simply evaporating down to dryness, weighing, and then igniting and weighing a second time, always leads to inexact results, and commonly produces an over-estimate of the amount of organic matter, owing to the loss especially of hydrochloric acid and carbonic anhydride, if much magnesian salts are present.

It is better to add a known quantity of fused carbonate of soda‡ to the vessel

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* Since this paper was read, one or two alterations have been made in detail, in consequence of the remarks of friends, either at the meeting of the Chemical Society or in conversations since.

† If iron be present, special attention must be paid to this impurity.

‡ In this and some other cases we have changed the names, and omitted or changed the

in which the evaporation is being effected. This evaporation is best performed in a platinum crucible capable of containing at least three ounces of water, and provided with a platinum cover. If it be intended to evaporate down two deci-gallons of the water, a known quantity, say four or five grains, of carbonate of soda should be added (or about 0·3 grm. of the carbonate to a litre of water). When the weight of the dry residue is ascertained, the amount of this carbonate is simply deducted from the weight obtained. Where the examination of several waters is in progress at once, the evaporations may be conveniently conducted in a copper steam-bath, in which they are carried to apparent dryness. The drying must be completed in an air-bath, the temperature of which is maintained for one hour at about 284° or not exceeding 302° F. (140° to 150° C.). The residue is then carefully weighed. The organic matter is afterwards burnt off at a red heat barely visible in daylight, and the residue when cold is again weighed. These weighings are more liable to error than any others during the analysis, and nowhere is an error of one or two hundredths of a grain more important. It is almost needless to say that the crucible must in each case be covered, and allowed to cool completely over a dish of sulphuric acid, and that the crucible must be introduced into the balance by means of tongs, as, if it be touched with the fingers, the warmth of the hand, by expanding the air contained within the covered crucible, would be liable to sensibly alter its weight. After the residue has been ignited, the saline mass must be moistened with a saturated solution of carbonic acid in distilled water, as first recommended by Dr. T. Clark. From two to three ounces of the carbonic acid solution should then be poured into the crucible. This solution must again be evaporated to dryness, and the residue maintained for one hour in the air-bath at the *same* temperature as that employed in the original desiccation. If any sensible amount of magnesian salts be contained in the water, the residue, after this treatment, will be found to have increased in weight by two or three tenths of a grain, when compared with the weight after simple incineration.

In this way, we shall have ascertained the amount of the soluble constituents (both fixed and organic), as well as an approximative estimate of the amount of organic matter.

Nearly all waters, however, contain ammoniacal salts in minute quantity, and a variable amount of nitrates. The ammonia would of course escape as carbonate during the evaporation, but as the quantity of ammonia seldom exceeds a few thousandths of a grain per gallon, this introduces no error of importance. The nitrates would also remain nearly unchanged, even after ignition, unless the quantity of organic matter were considerable, when they would necessarily undergo decomposition more or less complete on incineration, and the loss of weight then observed would be due partly to this cause.

(8.) *Use of Permanganate of Potash.*—In the year 1850 Professor G. Forchhammer, of Copenhagen, proposed to employ a solution of permanganate of potash for the determination of the amount of organic matter in water (Trans. Roy. Danish Society, 5th series, Physical and Mathem. section, vol. 2nd). At the time, the method attracted but little attention, but recently many chemists have been induced to attempt to modify the process, and substitute its indications for the ambiguous results obtained by incineration. As a substitute it will probably fail, but as an accessory test it appears to be likely to render good service in assisting the judgment as to the salubrity of a water.

I have made a large number of experiments with the view of testing this method, and will now describe the plan which has succeeded in my hands.

A solution of permanganate of potash of convenient strength is first prepared; for this purpose the liquor may contain an amount of permanganate such that 10,000 water-grain measures shall in an acidulated solution exert an oxidizing power equal to that of one grain of oxygen, or 1 c.c. of liquid shall be equivalent to 0·1 milligramme of oxygen. For this purpose 3·95 grains of pure crystallized permanganate in 10,000 grains of water should suffice. This will be equivalent to 0·395 gramme of the salt in a litre of water; but its power may be exactly measured by means of a *freshly prepared* solution of crystallized oxalic acid containing 7·875 grains in 10,000 measured grains of water, or 0·7875 gramme of oxalic acid in 1 litre of water. 100 measures of this solution warmed with a very dilute solution of sulphuric acid should decolorize exactly 100 measures of the permanganate. 0·05 gall. (8 oz.) of each of the several waters for trial are then placed

symbols used by the author, as he has adopted the new chemical nomenclature and notation, which would be unintelligible to many of our readers.—Ed. Ph. Journ.

in a flask with 30 grains of undiluted hydrochloric acid, or 50 grains of diluted sulphuric acid (1 of acid to 3 of water); either acid may be used with equal advantage. The permanganate may then be added either in successive small doses till an excess is reached, or an excess may be added at once and the excess determined at the end of the experiment; either plan will answer. If the method by gradual addition be preferred, to each flask must be added 20 grains of the permanganate solution, the flasks being arranged on a white ground side by side in front of a window: no artificial heat must be employed.* At intervals of fifteen minutes the flasks are examined, and successive quantities of 10 or 5 grains of the permanganate solution are added, in proportion to the rapidity and completeness with which the colour disappears. These successive additions of the permanganate must be made until the last addition remains sensibly unaltered after the lapse of half an hour, which generally occurs between two and three hours from the commencement of the experiment. The number of water-grains of permanganate consumed in each case is then ascertained, deducting the last portion, which, it is estimated, remains unaltered in the flask. A little uncertainty occurs in estimating the amount of residual tint by the eye, and this occasions a variation of 2 or 3 divisions in different experiments. On multiplying by 20 the number of water-grains of permanganate solution consumed in each flask, we have the quantity of oxygen in ten-thousandths of a grain consumed in oxidizing the organic matter in one gallon of each sample of water.

The following table comprises the results of a series of trials with the same solution of permanganate, under varying circumstances, upon six different samples of acidulated water, and may serve as a specimen of the effects which such variations exert upon the amount of permanganate destroyed.—Temp. from 59° to 68° F. (from 15° to 20° C.)

Permanganate added gradually.

	A.	B.	C.
1st water	41	41	40
2nd „	47	42	—
3rd „	35	35	—

Permanganate added in excess.

	E.	F.	G.	H.	I.	K.
4th water......	16	15	15	14	13	—
5th „	44	48	46	49	50	51
6th „	45	45	47	43	47	43

Acid used in A, dilute sulphuric
„ „ B, hydrochloric
„ „ C, sulphuric
} Duration of experiment $2\frac{3}{4}$ hours.

This process may be simplified by adding at once an excess of the solution of permanganate, allowing the whole to stand for three hours, and then destroying the permanganate in excess by the addition of a reducing agent. Various reducing agents were at first tried unsuccessfully: amongst them were sulphurous acid, sulphite of soda, hyposulphite of soda, protochloride of tin, and arsenious acid; but the results of repeated trials with the same water varied so much, that it was obvious this plan could not be relied on, partly owing to the action of the varying quantity of dissolved oxygen in the waters upon the reducing agent employed, and partly owing to the difficulty of removing a certain residual brown tint, due to a compound of one of the intermediate oxides of manganese, which is commonly produced in waters rich in organic matter. When the water was originally mixed with the permanganate in excess, this brown tint disappears slowly, and only by using an excess of the reducing agent.

This difficulty, however, may be obviated, as suggested by Mr. V. Harcourt, by adding to the water, at the termination of the oxidizing action, a small quantity of a solution of iodide of potassium and a little starch-paste; the excess of permanganate or of manganic salt is by this means at once reduced to a manganous salt, and the amount of iodine liberated may be determined by the addition of a standard solution of hyposulphite of soda, which may be graduated by means of the solution of permanganate itself. For this purpose 10 grains of the crystallized hyposulphite when dissolved in 10,000 grains of water, or 1 gramme of the salt in a litre of water, will furnish a solution of convenient strength.

* Two hundred and fifty cubic centimetres of the water with 2 c.c. of hydrochloric acid may be employed, and successive amounts of 0·5 c.c. of the permanganate solution may be used: on multiplying by 4 the number of cubic centimetres of permanganate employed, it will give the amount of oxygen in tenths of a milligramme required to oxidize the organic matter in each litre of water.

The solution of potassic permanganate, as well as the solution of dichromate, should be preserved in bottles, made of glass, free from lead.

The burette must be read off the instant the colour disappears, as on standing the blue tint returns.

The columns headed E, F, G in the table given above refer to three successive trials of the same three waters; 0·05 gallon was mixed in E with 50 grains of dilute sulphuric acid, and exposed for three hours at ordinary temperatures with 50 grains of permanganate solution. F, a similar and simultaneous experiment, but employing 70 grains of permanganate. G, a repetition of the experiment, using 100 grains of the solution of permanganate. H, I, K were three trials with the same waters on the following day, acidulating in the same manner as before. In H, 80 grains of the permanganate solution was employed. I, was a second trial with 100 grains; K, with 150 grains of permanganate.

The results of these and of numerous other experiments lead me to recommend that the permanganate be mixed in excess at once with the water acidulated with sulphuric acid, and that the experiment be continued without applying heat. At the end of three hours the excess of permanganate is to be determined by the aid of iodide of potassium, starch, and hyposulphite of soda.

Various objections will naturally be raised to the use of the permanganate. It may be said—1st, That the quantity of permanganate required will vary with the kind of organic matter, so that the bulk of liquid decolorized will not necessarily be proportioned to the weight of the organic substance present. 2nd, That certain organic compounds may be absolutely or comparatively harmless, while an equal weight of some other organic body in active putrescence may be seriously deleterious, and that the permanganate does not distinguish between the two, so that a water which is comparatively harmless may even decolorize a larger amount of permanganate than another water containing a dangerous amount of some septic poison. 3rd, That bodies not organic—such, for instance, as the nitrites—will bleach the permanganate.

It may be replied that though this method, by the permanganate, is liable to these defects, yet that the very same objections apply with even greater force to the processes hitherto employed; and, further, that it is not improbable that the substances most readily oxidized are just those most likely to be injurious in their effects upon those who drink the water. Moreover, if nitrites are present, their action will be almost instantaneous, while that of the organic matter is gradual; besides which other tests will reveal the presence of nitrites.

(9.) *Gaseous Constituents.*—Conjointly with these observations on the action of the permanganate, it is of considerable importance to determine the gaseous contents of a water, and in particular the proportion of *dissolved* oxygen which it contains. I have already described in detail elsewhere an easy method of determining the amount of carbonic acid, oxygen, and nitrogen in a water, sufficiently accurate for this purpose (see my Elem. Chem. 3rd edit. vol. ii. pp. 40 and 60). For this purpose, however, it is necessary that the water be collected in glass stoppered bottles, filled as completely as possible; and the determination of the gaseous contents should be performed within twenty-four hours, or at least not more than forty-eight hours after the water has been collected.*

Whenever the proportion of oxygen is less than one-third that of the nitrogen, the water is to be looked upon as imperfectly aerated, the proportion in perfectly aerated water being, as is well known, owing to the superior solubility of oxygen, that of 1 of oxygen to 2 of nitrogen. The proportion of carbonic acid in the mixed gas is determined by means of a concentrated solution of caustic potash, of sp. gr. 1·3, and the oxygen by the subsequent addition of pyrogallic acid (1 part of acid to 6 of water), as practised by Liebig.

(10.) *Estimation of Ammonia.*—The determination of ammonia is a point of importance, but it may be readily effected as follows:—Into a capacious retort a quart of the water is introduced, and the retort connected with a suitably-mounted Liebig's condenser; an ounce of baryta-water is then added, and 10 ounces of water are distilled over slowly.

* It is much to be wished that chemists would insist upon a greater uniformity in the way of collecting samples of water for analysis. Glass bottles, well stoppered, should alone be used for the purpose. Stoneware jars, which are often, but most improperly substituted for glass, should peremptorily be discarded. The stoneware is liable to introduce both sulphate of lime and common salt into the water. Persons who collect the samples of water should be instructed to rinse out the bottles thrice on the spot, and whenever it is practicable to submerge the bottle completely in taking the specimen.

We may also use 1 litre of water, 25 c.c. of baryta-water, and distil over 250 c.c. of water. The residue in the retort is filtered and separated from carbonate and sulphate of baryta, and then evaporated for subsequent determination of the nitrates by Pugh's method (par. 12). Too much care cannot be taken in conducting these experiments on the amount of ammonia, for, owing to the condensation of ammoniacal salts upon glass vessels kept in a laboratory, unless much vigilance be exercised, an undue proportion of ammonia is liable to be reported.

The distillate is divided into two equal portions; one of these is submitted to Nessler's test for ammonia in the following manner, as practised by Mr. Hadow:—Make a concentrated solution of 1 ounce or more of corrosive sublimate; having dissolved $2\frac{1}{2}$ ounces of iodide of potassium in about 10 ounces of water, add to this the mercurial solution until the iodide of mercury ceases to be dissolved on agitation; next dissolve 6 ounces of solid hydrate of potash in its own weight of water, and add it gradually to the iodized mercurial solution, stirring whilst the mixture is being made; then dilute the liquid with distilled water till it measures 1 quart. When first prepared, it usually has a brown colour of greater or less intensity, owing to the presence of a little ammonia; but, if set aside for a day or two, it becomes clear and nearly colourless; the clear liquid may then be decanted for use. For a litre of the test liquid of equal strength, 62·5 grammes of iodide of potassium and 150 grammes of solid caustic potash will be required. About 50 grains (3 c.c.) of this solution are drawn off by a marked pipette and added to one-half of the distillate; if no ammonia be present, the mixture remains colourless, but if ammonia be present, the liquid will assume a yellowish tinge of greater or less intensity. The liquid will remain clear if the ammonia do not exceed one two-hundredth of a grain in the 5 ounces, or about 0·25 mgrm. in 125 grms. of the distillate. The quantity of ammonia in such a case may be very accurately estimated in the following manner:—A solution of sal-ammoniac is prepared containing 3·17 grains of the salt in 10,000 grains of water (or 0·317 grammes of salt per litre), which is equivalent to one ten-thousandth of a grain of ammonia (H_3N) in each grain of this solution, or 0·1 gramme in 1 litre. Suppose that a tint is obtained in the distilled liquid, which experience leads the observer to estimate, say at five thousandths of a grain; 50 grains of the standard sal-ammoniac solution are placed in a beaker, similar in size to that used for the distillate under trial, then diluted with 5 ounces of distilled water, previously ascertained to be free from ammonia (an impurity not unfrequently met with in the first portions of water which come over in distillation); lastly, 50 grains of the mercurial test-liquor are added.

If the tint coincides in intensity with that furnished by the distillate, which has received an *equal quantity* of the mercurial test, the amount of ammonia may be considered to correspond with that taken in the liquid for comparison. If the distillate appear to have a deeper or a paler tint, a second approximative trial with a larger or a smaller quantity of sal-ammoniac must be made, and so on until the operator is satisfied that the tints coincide. On multiplying the number of grains of sal-ammoniac solution employed by 8, the product will give, in ten-thousandths of a grain, the quantity of ammonia per gallon in the water under examination.* When the quantity of ammonia exceeds the 20th of a grain per gallon, or 0·6 mgrm. per litre, it is necessary to determine the amount by neutralization; and it was to provide for this contingency that the second half of the ammoniacal distillate was directed to be reserved. A test acid composed of 2·882 grains of oil of vitriol in 1000 of water, or 2·882 grammes SO_3,HO diluted to 1 litre, will contain an amount of acid, 1 grain of which will neutralize one ten-thousandth of a grain of ammonia, or 1 c.c. will be equivalent to 1 milligramme of H_3N. The neutralization is effected in the ordinary way, using infusion of litmus to indicate the point of transition from alkalinity to commencing acidity. During the separation of ammonia from the water by the distillation with baryta as above directed, it will often happen that some peculiar or characteristic odour is developed, which may be of importance as indicating some source of contamination which might otherwise be overlooked.

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* Suppose that the observer estimates the amount of ammonia in the 125 c.c. on which he is operating at 0·25 mgrm., he takes 2·5 c.c. of the sal-ammoniac solution, and dilutes it with distilled water to 125 c.c.; he then adds 3 c.c. of the mercurial liquor, and compares it with the tint produced in the distillate by a like addition of the mercurial test. If the two tints correspond, multiply by 2 the number of c.c. of sal-ammoniac solution required, and the number obtained will give the proportion of ammonia per litre in tenths of a milligramme.

(11.) *Estimation of Nitrites.*—The presence of the alkaline nitrites in the well waters of towns is not unusual. The reaction of the nitrites upon iodide of potassium and starch, employed by Dr. D. Price as a test for the iodides, may be used conversely to detect traces of the nitrites in waters, which it will reveal even when the amount of nitrite present is considerably less than a grain per gallon. It is merely necessary to add to a little dilute starch a few drops of a weak solution of iodide of potassium, and then a few ounces of the water slightly acidulated with dilute sulphuric acid; an instantaneous blue coloration of the starch by liberated iodine will occur if the water contains any sensible amount of nitrite. The quantity of nitrites may be approximately estimated by the amount of a graduated solution of permanganate which a given measure of the water (say 0·05 gallon, or 250 c.c.) will bleach. When the solution of permanganate of potash is employed to determine the amount of organic matter, if nitrites be present, part of the permanganate will be destroyed by their action: the bleaching, though not absolutely instantaneous, takes place in a few seconds; and, therefore, it can be at once distinguished and measured separately from the reducing effect occasioned by the organic matter, which is always very gradual. The decoloration of 1 grain of a solution of permanganate of such strength as is described in paragraph 8, would represent 0·00237 grain of NO_3; or 1 c.c. would be equivalent to 0·237 milligramme of NO_3.

(12.) *Estimation of Nitrates.*—The method which may be conveniently employed for this purpose is that contrived by Dr. Pugh (Chem. Soc. Q. J., xii. p. 35), which, when the following precautions are observed, is very trustworthy and manageable. The liquid from which the ammonia has been expelled, as directed in paragraph 10, is filtered from the mixed barytic sulphate and carbonate, and is then concentrated by evaporation to about 1-50th of its original bulk. About 30 grains (2 c.c.) of this liquid are then mixed with about an equal bulk of a strong solution of ferrous sulphate in a test-tube, and concentrated sulphuric acid is allowed slowly to flow down the inclined side of the tube, and, by the depth of brown coloration at the line of junction between the two liquids, the comparative richness in nitrates is roughly estimated. The quantitative determination may now be proceeded with. The standard solution of protochloride of tin may contain advantageously about 14 per cent. of the salt dissolved in a liquid containing about one-third of its bulk of ordinary hydrochloric acid of sp. gr. 1·150. A strong tube of hard glass, capable, when sealed up, of containing at least 130 grains of water, or 8 c.c., is sealed securely at its lower extremity, drawn off to a strong capillary neck, and into it a given bulk, say 46 grain measures, or 3 c.c., of the tin solution is accurately measured by means of a pipette with a fine stem, not exceeding 1-10th inch in diameter. An equal bulk of the concentrated water is then measured in with the same precision, a small fragment of marble is introduced, and after effervescence has ceased, the capillary neck is drawn off and securely sealed. The tube is next to be exposed in an air-bath for twenty minutes to a heat of 340° F. (about 170° C.), and allowed to cool. The contents of the tube are then introduced into a beaker with 50 grains of hydrochloric acid and an ounce of water (or 3 c.c. hydrochloric acid and 30 c.c. water), a little starch paste, and a few drops of a solution of iodide of potassium. To this mixture a solution of bichromate of potash is added until the starch just indicates free iodine. In measuring off the solution, one of Mohr's burettes, graduated to divisions each equal to ten water-grains, and provided with Erdmann's float, leaves nothing to be desired in volumetric accuracy. If the solution of bichromate be made to contain 7·277 grains of the salt in 1000 grains of water, each grain of the solution will be equivalent to one-thousandth of a grain of nitric acid; and in like manner, if 7·277 grammes of the salt be dissolved in a litre of water, every cubic centimetre will represent a milligramme of nitric acid (NO_5). An equal measure of the tin solution must be similarly tested; the difference in the number of grains of bichromate solution required in the two cases will give the number of thousandths of a grain of NO_5 present in the quantity of water submitted to experiment. If, for example, 1-5th gallon of water be concentrated to 280 grains, and 56 grains, or 1-5th of its bulk, be operated on, the amount employed represents that contained in the 25th part of a gallon, so that, if the amount of NO_5 obtained be multiplied by 25, it will give the amount per gallon. If the burette divisions each correspond to cubic centimetres, the quantity of NO_5 contained in the portion of concentrated water submitted to trial, will be given in milligrammes. The tubes, when carefully sealed, scarcely ever burst in this experiment when a sufficient space for the expansion of the liquid is allowed. If about 1-4th of the capacity of the tube be left free of liquid, the space is found to be ample.

(13.) *Lead.*—This impurity may be derived from leaden cisterns or service pipes. It is easily detected by acidulating with two or three drops of acetic acid, and adding to the water about 1-20th of its bulk of an aqueous solution of sulphuretted hydrogen. On looking down through a tube containing a column of water so prepared, 10 inches in length, upon a white surface, and comparing with it a similar tube filled with the water without any addition, a brown discoloration, more or less intense, will be distinguished in the tube containing sulphuretted hydrogen, if lead be present; the amount of lead may be estimated by preparing a standard solution containing one ten-thousandth of its weight of lead, diluting the required quantity of this liquid with a known volume of distilled water, and comparing it with the water after the action of sulphuretted hydrogen, in a manner similar to that directed to be followed in the colour estimation of ammonia (par. 10). The standard lead solution may be prepared by dissolving 1·831 grain of normal crystallized lead-acetate in 10,000 of water, or 0·1831 gramme of the lead-salt in 1 litre of water.

(14.) *Determination of Saline Constituents.*—I have little that is new to add on this head respecting the actual quantitative estimation of the various constituents, but I should strongly recommend that in every case the amounts of the chlorine, sulphuric, nitric, and silicic acids, the lime, magnesia, ammonia, potash, and soda, as actually obtained by experiment, should be given, as well as the weight of the earthy carbonates separated during ebullition. If the potash and soda are not estimated separately, their joint weight should be determined by precipitating the chlorine or sulphuric acid from the alkaline chlorides or sulphates. By reporting the results of our experiments in this way, and in this way only, is a strict comparison of the analytical results of different observers possible without much unnecessary labour.

On the representation of the exact form in which the different acids and bases are arranged in any water, chemists are not agreed, and it would be better to omit the practice of reporting the names of the salts altogether. If the plan thus recommended be adopted, the sum of the saline constituents would, of course, not correspond with the amount of fixed saline residue obtained on evaporation, but a general statement of the character of the water,—whether, for instance, calcareous, magnesian, or alkaline salts preponderated; whether carbonates, sulphates, or chlorides are most abundant,—would convey more real information to those who know little of chemistry than any enumeration of saline constituents, which no two chemists would report exactly in the same way.

Of course, in all cases of importance, each determination should be made in duplicate; a decigallon or a half-litre being quantities well suited to experimental work.

It is almost needless to say, that in all accurate experiments the precipitates should be collected upon filters which have been previously soaked in dilute nitric acid (1 part acid to 30 of water), and afterwards thoroughly washed in distilled water and dried.

It is obvious that the analysis must always be performed upon water absolutely freed from suspended matter, either by subsidence, which is best, or by filtration.

The *soluble silica* is determined in the usual manner from the portion of water (0·2 gallon, or 1 litre) evaporated down with carbonate of soda for fixed constituents. The ignited residue is treated with hydrochloric acid, adding distilled water, and then collecting the undissolved residue on a filter, igniting, and weighing.

The filtrate must be treated with a slight excess of ammonia, immediately filtered, and the precipitate thus separated will contain the *oxides of iron and manganese*, the *alumina*, and the *phosphates*. They may be reported together.

No direct determination of the quantity of *carbonic acid* which exists in combination with bases, can be conveniently practised, but the amount of mixed carbonates can be obtained with a fair approach to exactness by taking two Florence flasks—A and B—of similar size, counterpoising one against the other, and boiling down two decigallons of water in the flask A, concentrating to one-fourth of its bulk (or one litre boiled down to one-fourth), adding the water by degrees as it boils away. The ebullition must be conducted with the usual precaution of inclining the flask, so as to prevent loss by spirting.

The concentrated water must then be filtered upon a small weighed filter, washing out the loose portions of the carbonate into the filter, drying the flask A and adhering carbonates at 212° (100° C.), and sucking out the moist air, weighing when cold, counterpoising with the empty flask B, which should be placed alongside the flask A with the carbonates whilst it is cooling, the weighings being repeated as usual till after reheating to 212° they become constant. The lime and magnesia in the precipitate can be estimated in the usual way if desired, and the deposited salts should be tested for sulphates, as a small quantity of sulphate of lime may occasionally be deposited if the quantity of sulphates be considerable.

It is easy to convert the report of the number of grains per gallon (70,000) into parts in 1,000,000 (or what amounts to the same thing, to milligrammes per litre), by dividing the result by 7, and multiplying by 100. If the quantities per litre have been obtained in milligrammes, the proportion in grains per gallon is given by the converse operation of dividing by 100 and multiplying by 7.

It may for the present be expedient, in accordance with popular usage, to continue to report the contents of the water per gallon, but the decimal report should never be omitted, as at no distant period we must anticipate that our insular prejudices in favour of our inconvenient system of weights and measures, will disappear before the manifest advantages of the decimal notation and the metrical system; and it certainly is to be expected from our men of science that by the adoption of the method in their reports to the public, they will facilitate and hasten its introduction. It is with the view of aiding in this respect that I have in this paper given the weights and measures on the English method, and also their equivalents on the metrical system,—perhaps, in some measure, at the expense of succinctness, though I hope not of perspicuity.

In reporting a water, therefore, it might be convenient to sum up the results in some such form as the following:—

	Grains per gallon.	Parts per 1,000,000.
Appearance		
Colour in two-foot tube		
Amount of sediment		
Containing { Combustible matter		
Inorganic residue		
Taste at 86° (30° C.)		
Odour		
Hardness on Clark's scale		
Do. after boiling one hour		
Oxygen absorbed by organic matter from permanganate		
Total solid contents		
Consisting of { Volatile and combustible matter . .		
Fixed salts		
Earthy carbonates		
The fixed salts containing . { Chlorine		
Sulphuric acid (SO_3)		
Nitric acid (NO_5)		
Soluble silica		
Lime		
Magnesia		
Oxides of iron and manganese, alumina, and phosphates		
Potash (KO)		
Soda NaO		
Ammonia		
	Cubic inches per gallon.	Vols. in 1000.
Total gases dissolved		
Consisting of { Carbonic acid (CO_2)		
Oxygen		
Nitrogen		
Ratio of oxygen to nitrogen		

Journal of the Chemical Society,

EXTRACTS FROM MINUTES OF EVIDENCE GIVEN BEFORE THE SELECT COMMITTEE ON THE CHEMISTS AND DRUGGISTS BILL.

Dr. Alfred Swaine Taylor, examined.

Chairman.] 9. You are aware, I believe, of the present state of the law in respect to the qualification of chemists and druggists ?—Yes, I am. I am generally acquainted with the requirements of the Pharmacy Act.

10. Under which, generally speaking, no restriction is placed on the sale of drugs by any person who chooses to keep a shop for their sale ?—With the exception of arsenic. There is an exception with regard to arsenic.

11. But with regard to no other drug ?—But with regard to no other drug, so that a person can obtain any poisonous drug he pleases; it depends entirely on the conscientious feelings of the seller to supply him or not. I believe a great number of these exist in the chemist and druggist trade; the better class of druggists put great difficulty in the way of obtaining these poisonous drugs; some do not sell them at all. I have tried in Edinburgh to procure a common poison, cyanide of potassium, but they refused to let me have it until I explained who I was, and gave some reason for obtaining it. The sale of these substances is not so much with the higher class of chemists and druggists as with the lower class, where oxalic acid, and substances of that sort, can be obtained in common shops; grocers, oilmen, and persons of that kind.

18. You think some restriction on the sale of drugs is advantageous for the protection of the public ?—I do, indeed ; I am strongly impressed with that, from the number of cases that have come before me, and where persons have not died, but recovered. They have brought bottles to the laboratory at Guy's Hospital, and have asked for an examination. When I have made inquiries, I found they got the medicines in some low shop where persons are allowed to sell these things; selling laudanum for tincture of rhubarb, and so on; one is frequently mistaken for the other, not by competent druggists, but persons who are allowed to sell these drugs like druggists.

19. What is the nature of the protection you would recommend ?—I had sent to me, with reference to this question, two Bills, which I then saw for the first time.

20. We should prefer your not going into the Bills, but stating your own views.—I am prepared to say, from looking over the matter, I think it would be possible to construct a measure which would protect the public, improve the profession, and give the medical profession a certainty that their prescriptions would be well carried out.

21. Am I to understand the suggestions you made in this report, which I hold in my hand, are those which you would advocate ?—They are substantially the conclusions and suggestions at the end of the report.

22. Perhaps you will be kind enough to read them ?—I will ; and make any remarks, if you will allow me, as to any alterations. The 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."

Mr. Roebuck.] Meaning in every part of the country "capable of acting as poisons." Then, secondly, "That the sale of poisonous drugs by chandlers, grocers, oilmen, drapers, or small shopkeepers should be strictly prohibited." I put the word poisonous.

Chairman.] 23. Upon that second suggestion, may I ask whether you think there would be any insuperable difficulty in inserting in a schedule those drugs upon which you would wish to put a prohibition in regard to the sale ?—I do not think there would be. I have considered a schedule in my own mind which I am prepared to lay before the Committee. Then the third conclusion is, "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." By pharmaceutical chemists I do not mean any particular class, but those persons who are properly educated and men of experience ; those who have undergone an examination ; those who have been regularly instructed in the nature of drugs and their properties. "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."

This, I think, is a *sine quâ non* with regard to the safety of the public, the certainty as to medical prescriptions, and the proper status of the druggist's profession. Then, fourthly, "Under no circumstances should boys or girls, or persons who cannot read or write, be permitted to sell poisonous drugs." I think this will be undisputed. There have been several cases where boys have been allowed to sell poisons, and serious consequences have followed; they have mistaken one thing for another. Then, fifthly, "Some rules are required for the management of a licensed retail trade in poisonous drugs. No youth should be allowed to sell them who is not above the age of eighteen years, and who has not been 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, or, at any rate, passed an examination somewhere, to show his knowledge of them. I do not wish to limit it to the Apothecaries' Company or to the Pharmaceutical Society; any properly-constituted body would meet my view. Sixthly, "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." Seventhly, "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." Eighthly, "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 or sale, there should be a witness of adult age." Ninthly, "All poisonous drugs sold should be distinctly labelled with the name of the drug, the address of the vendor, and the date of sale." Tenthly, "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." That, I may observe, I introduced on account of the cases of poisoning by arsenic which occurred at Bradford, in Yorkshire, some years ago: 120 persons were poisoned by some lozenges, and from twelve to seventeen died from the effects of the poison. There the person who sold it was not able to distinguish arsenic from plaster of Paris.

28. Apart from the question as to defining what culpable negligence would mean in such cases, you would provide persons the least likely to show negligence?—That is what I intended. I should mention another instance to the Committee. In one morning upwards of 300 cases of poisoning by arsenic came before me at once from an industrial school near London. A messenger brought to me the material that had caused the illness. On examining it, I found it to be a strongly saturated solution of arsenic; and, on going into the history of the case (I think there were 370 children made ill), I found that arsenic had been mixed with the milk, and each child had taken about a grain of the poison. Many pounds of arsenic had been put into a steam-boiler with soda, the whole had been allowed to mix, and the water had been drawn off from the steam-boiler to mix with the children's milk: 370 children suffered from the effects of the arsenic. Fortunately they all recovered, at different periods, by vomiting and treatment. On going into the matter, which I laid before the Secretary of State at the time, it was found that nothing could be done, because the arsenic had not been sold; it had been used by some engineer for the purpose of removing the fur from the steam-boiler. The man had used a large quantity to clean off the fur, had given no information about it, and thus led to the accident. I do not know that legislation could meet all these cases, but I attribute this accident to carelessness in not having given a proper intimation of the nature of the liquid. There was negligence on the part of no one, because it did not amount in law to culpable negligence.

Sir Fitzroy Kelly.] 33. Are you aware there is now no check or restriction, by law, upon any persons calling themselves chemists and druggists, and not only dealing with poisons and poisonous substances, but in the making up of medical prescriptions?—Yes, I am; any person may. There is no prohibition on any person in this country opening a shop, calling himself a chemist and druggist, putting coloured bottles in his window, and holding himself out as a fit person to deal with.

34. For both purposes; for poisonous matters, and for making up medical prescriptions?—Yes.

35. Are you of opinion that the safety of the public requires that some measure should be resorted to for securing competence, and a sufficient degree of knowledge on the part of persons becoming chemists and druggists?—I am, decidedly; I think it is as important, and perhaps more important, that it should be, than even with reference to the practice of medicine. It is as important to have medicines served by competent persons as to have them prescribed.

36. Now, independently of some measures which you have pointed out in your evidence, enabling those dealers to distinguish, by a kind of bottle, and so forth, as to the nature of the different substances or articles in which they deal, what measure should you be disposed to recommend to secure a competent degree of skill and knowledge and experience in the chemist and druggist, who has either to deal with poisons or poisonous substances, or to make up the prescriptions of medical men?—I think on no account should there be allowed the practice you have described, of either retailing drugs of a dangerous nature, or to make up medical prescriptions, except under the restriction of an examination. I would not have the examination too severe, or make it too close, but it should be such a practical examination that a man should be able to state, when drugs are put before him, what they are and their uses, and should know them; he should also be examined in his knowledge of Latin, and be able to interpret the weights and measures, and to translate freely.

37. I will not trouble you with any question as to the precise nature and extent of the examination; but are you, from your knowledge, experience, and also from the attention you have given to this subject, perfectly satisfied that public safety requires that some such test should be applied by some kind of examination for persons who are permitted to carry on the trade of chemists and druggists?—I am strongly of that opinion. I have an objection myself to having medicine made up by persons I describe, unless I know something of the locality, and the person who is the druggist.

38. And you express that opinion, as regards dealing with drugs of a dangerous character, and the making up of the prescriptions?—I do; I apply that observation to both.

Sir John Shelley.] 43. I think the substance of your evidence goes to this: that you think, as far as it can be done, it would be advisable that all persons, not only selling the poisonous ingredients, but selling drugs also, should pass some kind of examination?—No, I do not go quite to that extent.

44. Perhaps you will explain to the Committee?—For instance, I see no harm in unexamined persons selling Epsom salts and articles of that sort; but I say, with regard to all drugs or medicines which are likely to affect life, there should be restriction. I would not restrict the selling of castor oil or Epsom salts. I cannot draw the distinction between a poison and a medicine, but I can point out, from my experience, what has caused death during the last thirty years. I could suggest to you what I believe would create a great amount of safety, if restrictions were placed on certain articles.

45. And you would be anxious to bear in mind, not to interfere unnecessarily with trade generally?—I would; I should say unexamined persons might be allowed to sell such articles as are now sold in warehouses; sulphur, and articles of that sort.

46. In what way would you draw the line between the person in the village who would be permitted to sell the common things which you admit may be sold without any restriction, and the persons you would define as chemists and druggists, and who would have the sale of things other than absolute poisons like arsenic, morphine, and so on?—I should prefer, as a condition of legislation, that some date should be fixed, after which all dealers in drugs should undergo an examination. The observation made as to Epsom salts is that one need not unnecessarily interfere retrospectively with a trade that has grown up and been established many years for the supply of country places; I think you could do it without injury to the trade, and with benefit to the public, by fixing a date after which all dealers in drugs must undergo an examination.

47. That would be prospectively?—Yes.

63. Will you be good enough to read that list?—I may tell you that in France there are nineteen articles prohibited: that is, putting the vegetable alkalies as one article. These substances were prohibited by the law of 1850, which the present Em-

peror has modified; before that, there were many more comprised in the list, which have since been struck out. Those which I have in my list have been taken from a great number of cases which have come before me; arsenic, corrosive sublimate, the poisonous alkaloids; I have not mentioned the separate names of these: a man who deals in drugs ought to know them exactly and be able to distinguish them. Prussic acid, essential oil of bitter almonds, chloroform, oxalic acid, salt of sorrel (a compound of oxalic acid), and nux vomica; tincture of aconite; tincture of colchicum; cantharides, or Spanish flies; and cocculus indicus. Then there are three substances which raise a difficulty, two of them are poisons, and one a most frightful poison; the difficulty is with regard to placing any restriction upon its sale, because it is very largely used for innocent purposes, and can hardly be dispensed with. I am afraid restrictions upon it would give rise to a good deal of inconvenience; I allude to cyanide of potassium; I may call it solid prussic acid, that will be the better name to give it; two or three grains of it would be sufficient to kill a person speedily; it is one of the most fatal poisons we have; I may call it prussic acid in a solid state. As cyanide of potassium is largely employed in electro-plating and in electro-gilding, as well as in photography, and also employed by chemists for various purposes, it presents a difficulty. I need hardly say that it is desirable to have it sold only by educated men; and I think the Committee would see no difficulty in excluding the sale of it from such ignorant persons as we have described, in low villages and shops of this description. The keeping of it there might give rise to accidents, and I am of opinion it is at present difficult to obtain this substance from small shops. It is kept by the higher class of druggists, who know its use, and therefore I put this substance before the Committee as its extensive use presents one of the most difficult cases for legislation; but it is a deadly poison, and destroys life rapidly. Another substance, opium, is one that has given rise to difference of opinion. You will observe, probably, that I have not mentioned opium or laudanum in the list. I purposely omitted it, because I have had occasion to consider the views on both sides regarding it,—the necessity of supplying laudanum in small shops. I still think it would be for the safety of the public generally if this substance should not be allowed to be sold except by persons who have undergone an examination. It should not be allowed to be sold in small villages by general dealers, and persons of that description. I may say, that a friend of mine very nearly lost his life. He sent to one of these village shops near Windsor for an ounce of tincture of rhubarb. It was laudanum that was sent to him. Any person educated in pharmacy would have known the distinction immediately by the smell, but the ignorant woman sent an ounce of laudanum. He had a narrow escape of his life, and has not been to a village shop since. I now come to another article; and that is a substance only recently discovered, or comparatively recently discovered, and which is now largely used with reference to the aniline dyes—nitro-benzole. It is a very powerful poison in some respects. It has some of the character or smell of the oil of bitter almonds. I had a case of poisoning with it lately referred to me. It was sold for the purpose of giving flavour to confectionery, and it acted so quickly on the person who took a small quantity that he died a short time after. The difficulty about this poison is this: a person may take it and appear to be well for some hours, as if nothing was the matter with him. There was a coachman who went into the kitchen where the cook used this in place of oil of bitter almonds for flavouring pastry, and, after tasting it, he did not appear to suffer any ill effects. The man jumped on the coachbox, and took his master for a drive; it was only on returning home, some time after he had tasted this liquid, that he felt very ill, and he soon died. This liquid would not probably get into common use, because it could not be given to a person without his knowledge, as it has a peculiar smell. It is a dangerous substance to be allowed to be kept by uneducated persons. I cannot see my way exactly between fettering commercial liberty in obtaining a thing like this in quantities for manufacturing and at the same time protecting life. I do not wish to fetter commerce. It has been a result of my practice to see a large number of deaths from poison, and I am more impressed with the necessity of seeing something done to prevent these deaths from occurring.

64. May the Committee take it as your opinion that there are certain things that there would be no doubt whatever there should be strong restrictions against selling? —I do.

65. There are other things, much used in trade and commerce which may be difficult to deal with?—Yes.

66. And others in which you are of opinion there should be an interference in the sale of them?—That is my view; and I do not see why it should not be done. All I suggest is this, that you should not allow such dangerous substances to be in common hands; they should only go through the hands of skilled people. I think, with regard to cyanide of potassium, an experienced chemist and druggist, such as I have pictured to my mind, might be permitted, on reasonable grounds, without the restrictions which I put on certain other things, to sell it if required for chemical or trading purposes. I do not see, if you start with this proposition, that legislation would be very difficult. If you allow these articles to be in the hands of uneducated persons, I do not see how the matter can be dealt with so as to save public life.

Mr. C. W. W. Wynn.] 76. How do you propose to deal with the question of the wholesale warehousemen; would the wholesale warehousemen be examined?—No.

77. That would be another difficulty?—I would not say that.

78. How far do you mean to carry your examination?—It should include those who sell these articles by retail, especially those who make up prescriptions. The articles should be labelled, and care taken, in passing them from hand to hand, that certain precautions are observed.

Mr. Black.] 84. There are districts in the country where the population is thin, and where they are poor, and where a person who had undergone such an examination as is pointed out by this Bill could not exist; he would not have as much trade as would keep him alive; and therefore in such places as these you must find some person perfectly acquainted with drugs where people can get either Epsom salts or such articles as laudanum, for example; how would you do with that?—That is what I presented to you as a difficulty, undoubtedly. There is a demand for laudanum in all parts of this country; it is only a question whether that article is to be excluded or included in the list. I cannot conceive that there would be any urgent want of prussic acid or strychnia for medicine, but there would be time to get it from a town, as by means of communication by railway; there would be no difficulty. I quite agree, that in Wales and other places where the population is scattered, persons would have to go some miles to druggists who keep these things; but you might give the power of selling all articles not injuring life, and you might include chemists and druggists. It is a question whether the injury done to society, by children and adults being killed by such facilities in selling poisons, can be compared with the amount of injury that would be done by restricting the sale. I named opium, and the facilities for getting opium are such that the lives of children are now very extensively destroyed. It is owing to the facility of obtaining this drug. If the destruction of life is not to enter into the consideration of this matter, it might be obtained as it is now. The practice is carried on only at the expense of a great destruction of human life.

86. Would not the passing of either of these Bills interfere with any of the other surgical or medical bodies of the kingdom?—No, they would not.

87. The College of Surgeons at Edinburgh?—No, I do not see that they would; the only branch of the profession who would be affected by it are the members of the Society of Apothecaries. There are men who belong to the Apothecaries' Society who sell drugs by retail, and who also prepare medical prescriptions; but, I believe, the number is now small, and it is not carried on to any great extent. I do not see that this Bill would interfere with those branches of the medical profession.

Lord Elcho.] 92. With regard to the regulations in France, you said there were nineteen articles?—I have a list.

93. Is their sale absolutely prohibited?—No, not absolutely prohibited, except to a certain class of pharmaciens. According to my recollection, they are what are called the general pharmacien, who may practise all over the country. There is a different style of examination, and these drugs are allowed to be sold under certain restrictions, by entering the name and date in a book, and matters of that kind; but they cannot be obtained by the public in the same easy way that they can from any shop in this country. I see they have got a number of substances which I should not think it necessary to put in our schedule; among others, ergot of rye,—although used for the purposes of abortion, it would not be entered as a dangerous poison in any way.

94. How is laudanum dealt with in France; is it one of the nineteen articles?—It is; when I say laudanum, I am in doubt without my French book to refer to; it is opium and its extracts. I believe it applies to the sale of opium generally.

96. Are you aware whether in France these regulations for the safety of the lives of the public are attended with any inconvenience or much inconvenience, as to the difficulty of getting articles generally?—It does to some extent. I was in France last summer, and took the opportunity of making a little inquiry about it. Considering the great freedom we have, and which we have enjoyed in this country of purchasing everything everywhere, it would be considered a great restriction to go through so many formalities, and to go to a particular shop to get a particular article. I had some difficulty in a French town, but when I represented myself as a member of the profession they gave it me. It might here be felt as inconvenient for weeks or a year afterwards. There is in France a great interference with freedom of trade; with us there is a great destruction of life,—that is my strong impression.

(*To be continued.*)

THE TRIAL OF DR. PRITCHARD.

On Monday, July 3, Dr. Edward William Pritchard, of Glasgow, was placed at the bar of the High Court of Justiciary, Edinburgh, charged with the murder by poison of his wife and his mother-in-law.

The Lord Justice Clerk, with Lord Ardmillan and Lord Jerviswoode, occupied the bench.

The counsel for the Crown were the Solicitor-General of Scotland, Mr. Gifford, and Mr. Crichton; and for the defence were Mr. Clark, Mr. Watson, and Mr. Brand.

The prisoner was charged with having, between the 10th and 25th of February last, administered to Jane Cowan or Taylor, his mother-in-law, in tapioca, or in porter or beer, or in a medicine called Battley's Sedative Solution, tartarized antimony and aconite and opium, and with having, between the 22nd of December, 1864, and the 18th of March, 1865, administered to Mary Jane Taylor or Pritchard, his wife, in egg-flip, and in cheese, and in porter or beer, and in wine, tartarized antimony and aconite, to which charge the prisoner pleaded "Not guilty."

The first witness examined was Catherine Lattimer, lately cook in Dr. Pritchard's service, who gave evidence as to the illness of Mrs. Pritchard, which began in October, with frequent sickness, and generally came on after taking food, but this was not always the case. On the Tuesday before Mrs. Pritchard died, witness found a bit of cheese in the pantry, after eating which she felt a burning sensation in the throat, and became sick. Next day, prisoner asked witness to make some egg-flip for Mrs. Pritchard. The Doctor gave her the eggs, and while witness was beating it he came once or twice into the pantry, and dropped in what witness took to be pieces of sugar; he said he would add the whisky when it came upstairs. On pouring in the water, to see if it was hot enough witness tasted it, and remarked to Mary M'Leod it had a horrible taste. She had the same sensations after it as from the cheese, and continued sick till four o'clock in the morning. Witness remembered making some tapioca for Mrs. Pritchard, which was carried to the dining-room by Mary M'Leod.

Mary M'Leod, a girl of seventeen, housemaid at Dr. Pritchard's, and who had been seduced by her master, gave similar evidence, both as to Mrs. Pritchard's illness as well as that of Mrs. Taylor, who told witness that she surely had her daughter's illness. She died about midnight of the day she was taken ill. On one occasion, when Dr. Gairdner was called in to see Mrs. Pritchard, witness found her suffering from what she thought was cramp, and was much excited. She was sick almost every day, and complained of great thirst and pain in the stomach. Dr. Pritchard did not dine at the same time as his wife, but was sometimes in the room when the latter dined. Witness generally made the tea for Mrs. Pritchard, but it was sometimes poured out by the Doctor.

Mary Patterson was then examined; her evidence was corroborative of that of the previous witnesses.

Thomas Alexander Connell and Richard J. King, both medical students, boarding in

Dr. Pritchard's house, gave evidence to the effect that Mrs. Taylor appeared quite well in health on the day before her death.

Dr. William T. Gairdner deposed to having been called in to see Mrs. Pritchard, whom he found in a state of great exhaustion. She had been sick, but the most remarkable symptom was the violent state of excitement and the spasms in the hands. She was holding up her arms in bed, and the wrists were turned in; her thumbs were also turned in towards the wrists. His first impression was that she was intoxicated by the stimulants champagne and chloroform she had taken, and he gave strict orders that the stimulants should be discontinued. He was much puzzled to know what was the matter with her, and he wrote to Dr. Taylor, Mrs. Pritchard's brother, as he was not satisfied with the treatment which had been adopted.

Dr. James Paterson gave similar evidence. He was called in to see Mrs. Taylor, who, he was informed by Dr. Pritchard, had, in the act of writing a letter, fallen from her chair to the floor. He found her lying on the bed, having all the appearance of a sudden seizure. She was perfectly unconscious, the pupils of the eyes much contracted. His conviction was that she was suffering from some powerful narcotic. Mustard plasters were applied to the lower extremities, but from the first he considered the case to be hopeless. After her death he was applied to for a certificate, but refused, and referred the Registrar to Dr. Pritchard. His impression was that she was being poisoned by antimony, but he did not go back to see her, because she was not his patient; he did not consider it to be his duty.

Dr. J. Moffat Cowan stated that he was called to see Mrs. Pritchard, at the request of the prisoner.

John Campbell, manager of the Glasgow Apothecaries' Company's branch in Sauchiehall Street, said the prisoner had a running account with that establishment, and read entries proving the purchase by him of several quantities of tincture of aconite, tartarized antimony, strychnine, and other poisons. On three occasions he had obtained one ounce of tincture of aconite, and on two occasions one ounce of tartar emetic. Witness deponed that one ounce of tartarized antimony was an unusual quantity to sell. Two grains was the ordinary dose for an emetic, and the ounce contained 435½ grains. He had never sold an ounce of tartarized antimony to any other medical man in Glasgow, and the quantity purchased by the prisoner struck him. Two ounces would serve their business for twelve months, and they had a very large dispensing business. The quantity of aconite purchased was also unusual, and one or two ounces would cover all they sold of it in a twelvemonth. The prisoner had also purchased a very large quantity of chloroform—132 ounces between July and December, which exceeded all their sale to other persons. Witness had been a dispensing apothecary for twenty-three years, and had never sold so much poison to any medical men. Identified several phials produced.

John Currie, chemist, Sauchiehall Street, spoke to having furnished the prisoner in February and March with several quantities of solution of morphia, tincture of aconite, and solution of atropine. Several of the quantities had been sold by his assistant, but he had no doubt they had all been supplied.

The medical witnesses in the case were then called. The reports to which the witnesses spoke were nine in number, and the following is a brief statement of their purport:—No. 1 was a medical report by Dr. Douglas Maclagan, Professor of Medical Jurisprudence in Edinburgh University, and Dr. H. D. Littlejohn, Edinburgh, of the *post mortem* examination of the body of Mrs. Pritchard. It was dated the 21st of March, and stated that the body appeared to be that of a healthy woman of about the age stated on the coffin-plate, 39 years. It concluded,—"We have to report that this body presented no appearances of recent morbid action, beyond a certain amount of irritation of the alimentary canal, and nothing at all capable of accounting for death. We have, therefore, secured the alimentary canal and its contents, the heart and some of the blood, the liver, the spleen, the left kidney, and the urine, in order that these may be submitted to chemical analysis." No. 2 was the chemical report of Dr. Maclagan on the death of Mrs. Pritchard. "It having been stated to me that antimony was suspected in this case, immediately on returning from the *post-mortem* examination, I made a trial experiment in presence of Dr. Littlejohn, and my assistant, Dr. Arthur Gamgee, with three drachms of the urine, and obtained from this unmistakable evidence of the presence of antimony. Being obliged, in consequence of the death of a relative, to go to London, and having, by the above experiment, ascertained that my researches must be directed towards the discovery of antimony, I requested Dr. Gamgee, in conjunction with Dr. Littlejohn, to carry on the following preliminary process in my absence. The whole contents of the intestines were evaporated to dryness on a water bath, so as to obtain a solid residue; one-half of this residue was digested with water acidulated with tartaric acid, and filtered, by which a solution measuring two ounces and five drachms was obtained, in which any antimony present in the intestines would be found. One ounce of this fluid was subjected to a stream of sulphuretted hydrogen gas, and the orange-yellow precipitate which formed was collected on a filter and washed. This precipitate, and the remainder of the tartaric acid solution, were reserved for my examination on my return to Edinburgh on the 24th March. I then subjected these materials to the following examination. The orange-yellow precipitate was boiled in a tube with pure hydrochloric acid, and the solution thus obtained was mixed with water, when a white precipitate formed. The fluid containing this precipitate was again subjected to a stream of sulphuretted hydrogen gas, and again gave a deposit of an orange-yellow colour. One fluid drachm of the tartaric acid solution was treated by Reinsch's method, and another fluid drachm was treated by Marsh's process. By each of these well-known methods, and thus operating upon a quantity of fluid corresponding to a forty-second part of the contents of the intestines, I obtained unequivocal evidence of the presence of antimony. By digesting a small quantity of the dried residue of the intestinal contents with distilled water, filtering and subjecting the filtrate to Reinsch's process, I readily ascertained that the antimony was here present in the form of a compound soluble in water. There are only two preparations of antimony occurring in commerce which are soluble in water; the one of these, the chloride, is a strongly acid, dark brown, corrosive fluid, totally unsuited for internal administration; the other is what is known scientifically as tartarized antimony, and popularly as tartar emetic, a colourless substance, possessed of comparatively little taste, and in daily use as a medicinal agent. I have no doubt, and shall assume in the following statements, that the antimony found in Mrs. Pritchard's body was taken in this form. The remainder of the acid solution, amounting to one ounce and three drachms, was subjected to a process intended to determine the quantity of antimony present in the contents of the intestines; but though the presence of this metal was determined with the greatest facility, I found that the amount yielded by the materials which I used was too small to enable me to weigh it with sufficient accuracy. I also made an experiment with the contents of the intestines, directed towards the discovery of vegetable poisons. It is sufficient on this subject to say, that the result was entirely negative. I then subjected to analysis the following fluids and solids removed from the body of Mrs. Pritchard.

"1. *Contents of the Stomach.*—These amounted to little more than half an ounce, and were free from all odour of any poisonous drug. They were subjected, in the first place, to what is known as 'Stas's process,' for the separation of vegetable poisons, but not a trace of any of these was detected. The whole residues of this operation were preserved and subjected to examination for antimony, but none was found.

"2. *The Urine.*—The presence of antimony having been already ascertained in this secretion, the remainder, amounting to seven ounces, was employed to determine its quantity. The process followed here was a well-known one, by which the antimony is obtained in the form of sulphuret, after destroying the organic matter by means of hydrochloric acid and chlorate of potash. The quantity of sulphuret was readily weighed, and found to be rather more than one-tenth of a grain (0·1078 grain). This corresponds to nearly one-fourth of a grain (·218 grain) of tartar emetic.

"3. *The Bile.*—A little more than half an ounce of this fluid was obtained from the gall-bladder. By Reinsch's process fifty minims readily gave an antimonial deposit. The remainder of the bile, amounting to four drachms, was used to determine the amount of antimony in it, and it yielded sulphuret of antimony, corresponding to more than one-tenth of a grain (0·121 grain) of tartar emetic.

"4. *The Blood.*—The total quantity was six and a half ounces. One ounce was subjected to Reinsch's process, and readily gave evidence of the presence of antimony.

"5. *The Liver.*—The weight of this organ was found to be thirty-six ounces, a portion weighing less than four ounces (1460 grains) was subjected to Reinsch's process, and a sufficient amount of antimony was found to coat rather more than four square inches of copper foil. Although the existence in the liver of an abundance of antimony was to my mind satisfactorily established by the appearance of the coated copper foil, I deemed it right to employ a portion of the product thus obtained for confirming, by another test, the presence of antimony in the body of Mrs. Pritchard. For this purpose a piece of the copper foil, one inch long and half an inch broad, was boiled in a dilute solution of pure caustic potash, the copper foil being from time to time freely exposed to the air. The coating disappeared from the copper, and a solution was obtained, which, when acidulated with hydrochloric acid, and subjected to a stream of sulphuretted hydrogen gas, gave an orange precipitate, which again was dissolved in strong hydrochloric acid; this acid solution gave, on being mixed with water, a white turbidity, which again was turned orange by sulphuretted hydrogen. Another portion of the coated foil, measuring half an inch square, was heated in a fine glass tube, with a view to ascertaining the presence or absence of arsenic, which occasionally exists as an impurity in compounds of antimony. No arsenic, however, was found, nor had any been observed in the previous trial of the contents of the intestines by Marsh's process. Finding antimony thus abundantly in the liver, I made an experiment to determine its actual quantity in that organ. For this purpose I operated upon one thousand grains, by the process described above for determining the presence of antimony, and obtained an amount of antimony in the state of sulphuret (0·1234 grain) corresponding to a quarter of a grain (0·25 grain) of tartar emetic; the amount contained in the whole liver being almost exactly four grains (3·93 grains).

"I next examined the remainder of the solid organs removed from the body of Mrs. Pritchard, and have to state, that I have found more or less of antimony in the whole of them. I operated in no instance upon more than 350 grains, in every case following Reinsch's process. I thus obtained the evidence of the presence of antimony in the spleen, kidney, muscular substance of the heart, coats of the stomach, coats of the rectum, brain, and uterus. On the 29th of March I received from the hands of John Murray, sheriff's-officer, Glasgow, two parcels of clothes, with sealed labels attached to them, with a view to my examining some stains upon them. One of these labels bore, 'Police Office, Glasgow, Central District, 23rd March, 1865. Found in the house of Dr. Pritchard, 131, Sauchiehall Street, and referred to in the case of himself. (Signed) A. M'Call, Audley Thomson.' The label was signed by John Murray in my presence, and initialed by me. On the back of the label was the following list of the articles attached to it:—'One night-dress, 1 chemise, 1 nightcap, 3 handkerchiefs, 1 knitted woollen semet, a pair of worsted stockings, 1 woollen polka.' The other label was similarly dated and signed, the list on the back being—'2 sheets, 2 pillow-cases, 2 towels, 1 toilet-cover.' I examined such of the stains on these articles as appeared of importance, confining my experiments to a search for antimony, and I have to state, that whilst with many of the stains the result was entirely negative, I found antimony on the following:—1st, On the chemise, from a stain obviously of discharge from the bowels, and which had been marked by me A. 2nd, On one of the sheets, distinguished by me as No. 1, in a stain marked by me B. 3rd, On the other sheet, distinguished by me as No. 2, in a stain obviously of urine, marked by me A. 4th, On a toilet cover, in a stain of a reddish colour, looking like a wine-stain. It is hardly necessary to state that the materials employed in all these chemical operations had been ascertained to be entirely free from all metallic impurity. The following were the conclusions:—'1. That Mrs. Pritchard had taken a large quantity of antimony in the form of tartar emetic. 2. That having regard to the absence in her case of any morbid appearances sufficient to account for death, and to the presence in it of a large quantity of a substance known to be capable of destroying life, her death must be ascribed to the action of antimony. 3. That it is most unlikely that this poison was taken in a single large dose. Had this been the case, I should have expected to have found some more decided evidence of irritant action in the mouth, throat, or alimentary canal. 4. That from the extent to which the whole organs and fluids of the body were impregnated with it, it must have been taken in repeated doses, the aggregate of which must have amounted to a large quantity. 5. That from the large amount found in the liver, from its ready detection in the blood, and from its being found passing so copiously out of the body by the bile and urine, it is probable that some of the poison had been taken at no greater interval than a period of a few days previous to death. 6. That I am inclined to believe that it had not been administered, at all events in any great quantity, within a few hours of her death. Had this been the case, I would have expected to have found at least some traces of it in the contents of the stomach, and more in the contents of the intestines; whereas none was found in the former, and the amount found in the latter seems to be amply accounted

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for by the bile impregnated with the poison discharged into them from the liver. 7. That the period over which the administration had extended cannot be determined by mere chemical investigation, but must be deduced from the history of the case, with which I am unacquainted.' " No. 3 was a report of analysis in the case of Mrs. Pritchard by Frederick Penny, professor of chemistry, Glasgow. His conclusions were:—" 1. That all the parts of the body examined by me—namely, the stomach, liver, spleen, kidney, heart, brain, blood, and rectum—contained antimony. 2. That in the dried contents of the intestines the antimony was partly in a form soluble in water, and most likely in the state of tartar emetic or tartarized antimony. In the liver, kidney, and the other viscera, the antimony was deposited in a state insoluble in water. 3. That the contents of the intestines contained the largest proportion of antimony next the heart, then the liver, kidney, and spleen; less in the stomach, and the smallest quantity in the rectum, brain, and blood. Not knowing the total weight either of the contents of the intestines or of the several organs here enumerated, I was unable to calculate the total quantity of antimony in these matters, either separately or conjoined. 4. That the contents of the intestines, the spleen, the heart, the blood, and the kidney contained mercury; but that none of this metal was present in the liver, stomach, rectum, and brain; that in all these matters the mercury was in a state insoluble in water, and this result is quite consistent with the known property of mercury to form insoluble combinations with animal substances, even though it had been taken or administered in a soluble form during life. 5. That the largest quantity of mercury was contained in the contents of the intestines, next in the spleen and heart, and extremely minute traces in the blood and kidney. 6. That the presence of antimony and mercury in the contents of the intestines indicates that these metals were being passed from the deceased up to the time of death. 7. That no other metallic poison was contained in the matters examined. 8. That no aconite, morphia, or other vegetable poison, discoverable by chemical processes, was contained either in the contents of the intestines or in the stomach. 9. Not having detected any organic poison, either in the said contents of the intestines or in the stomach, it was not necessary to examine the other articles for such poisons, and more especially as the quantities of these matters received for analysis were too small to hold out any prospect of a successful result." No. 4 was a report by Dr. Maclagan and Dr. Littlejohn, dated the 30th of March, on the *post mortem* examination of Mrs. Taylor, whose body was exhumed at Grange Cemetery, Edinburgh, that day, and the coffin-plate bore, "Jane Taylor, died February 25, 1865, aged 71 years." The report concluded in similar terms to the report in the case of Mrs. Pritchard. No. 5 was the chemical report by Dr. Maclagan on the organs of Mrs. Taylor. The conclusions were:—" 1. That Mrs. Taylor had taken a considerable quantity of antimony in the form of tartar emetic. 2. That, having regard to the absence of any morbid appearances sufficient to account for death, and to the presence in the body of a considerable quantity of a substance known to be capable of destroying life, her death must be ascribed to the action of antimony. 3. That it is most likely that this was not taken in a single large dose. Had this been the case, I should have expected to have found some morbid appearances indicative of the irritant action of the drug. It appears to me more probable, from the amount found in the body, that it must have been taken in a succession of doses, not great enough individually to produce local irritant effects, but amounting in the aggregate to a large quantity. It is right, however, to add that a single copious dose, not large enough to produce marked local effects, might give rise to fatal depression of the system in a woman aged 71, whose heart was enlarged and somewhat dilated. 4. That from the fact that antimony was found copiously in the liver, was readily detected in the blood, and existed to the amount of a quarter of a grain in the stomach, some at least of the tartar emetic had been taken probably within a few hours before death. 5. That from mere chemical investigations I am unable to say over what length of time the administration of the antimony had extended, supposing it, as I believe, to have been taken in a succession of doses. This can be learnt only from a consideration of the history of the case, with which I am unacquainted. No. 6 was Professor Penny's report in the case of Mrs. Taylor. He certified as follows:—" 1. That all the articles subjected to analysis contained antimony. 2. That the dried contents of the intestines contained the largest proportion of antimony; next, the liver and stomach, then the blood, and in less quantity the heart, kidney, and rectum. 3. That part of the antimony in the contents of the intestines is in a form soluble in water. 4. That the kidney was the only article in which mercury was detected. 5. That neither the stomach nor the contents of the intestines contained aconite or morphia in quantity sufficient to be detected by known chemical processes. 6. That the articles subjected to analysis contained no other metallic poison than antimony and mercury, as reported above." Nos. 7 and 8 were reports by Professor Penny on the articles found in the house of the prisoner. "This paper package [A] contained 2850 grains of tapioca. The presence of antimony, in the form of tartarized antimony, was unequivocally detected. Its amount was found to be equal to 4·62 grains in the pound of tapioca. Not a trace of mercury was detected. This bottle [B] contained one ounce and five drachms of a dark brown liquid, having the odour and general appearance of Battley's solution of opium. It was found to contain an appreciable quantity of antimony in a soluble form. The amount was equal to 1·5 grain per fluid ounce of the liquid. It contained no mercury. (I am at present engaged in examining it for other substances.) The seven paper-packages [C], comprised in this production, were marked No. 1 to No. 7 inclusive. No. 1 contained a small lump of crystallized nitrate of silver, weighing 16·5 grains. It contained no antimony. No. 2 contained 132 grains of cummin seed in powder. Neither antimony nor mercury was found in it. No. 3 contained 143 grains of sugar of lead. Nothing extraneous were detected. No. 4. The contents of this package consisted of a mixture of mercury and chalk, weighing together 6·5 grains, and it was evidently the medicinal preparation called "Hydrargyrum c. Creta." No antimony was found in it. No. 5 contained a lump of opium, weighing 110 grains. No. 6 contained 13·5 grains of morphia, contaminated with a small quantity of nitrate of silver, which, from the appearance of the paper-package, had manifestly enfiltered accidently from without. No. 7 contained 1350 grains of a white, gritty, crystalline powder, which was found to have all the physical and chemical properties of sugar of milk. It was carefully tested for mercury, antimony, and other substances, but the results were entirely negative. This bottle [D] contained 18 fluid ounces of ginger wine. No antimony or mercury was detected. This phial [E] contained 3·5 grains of a white powder, which was found by analysis to be tartarized antimony. The three phials [F], included in this production, were labelled respectively 1, 2, and 3. No. 1 contained one ounce and three drachms of tincture of conium. No. 2 contained five drops of the same tincture. No. 3 contained two and one-half drachms of the same preparation. This phial [G] contained nine drachms and a half of a light yellow-coloured liquid, having the taste and odour of cinnamon, and consisting of a mixture of medicinal substances. It contained no antimony and no mercury. This cheese [H] was tested for antimony and mercury, but no evidence of the presence of these metals was obtained. This production [I] included six small phials, which were found to contain as follows:—No. 1. Four drops of tincture of aconite; No. 2. Twelve drops of the same tincture; No. 3. Thirty drops of the tincture of conium; No. 4. Fourteen drops of the tincture of conium; No. 5. Empty; No. 6. Nine drops of the tincture of digitalis. This paper package [K] contained 1695 grains of tapioca. Not the least trace of either antimony or mercury was detected in this tapioca. No. 1. A brownish-coloured and turbid liquid, measuring three fluid ounces, contained in a glass bottle, labelled chloroform. It was tested for antimony and mercury, but not a trace of either metal was detected. It contained no aconite. No. 2. A white crystalline powder, contained in a small cylindrical wooden box, with screw cover. It weighed 15·5 grains, and was found to consist of a mixture of tartarized antimony and arsenious acid (that is, the common poison of arsenic) in nearly equal proportions by weight. No. 3. About ten drops of colourless liquid, contained in a quart wine-bottle. It was found to be an aqueous solution of corrosive sublimate. No. 4 (A). A white powder, contained in a circular red pasteboard box. It weighed 5 grains, and was found to be calomel. No. 4 (B). A white powder, weighing 35 grains, contained in a green pasteboard box, It was found to be tartarized antimony. All the productions containing the articles subjected to analysis were securely closed, and had sealed labels attached."

After the medical and chemical reports had been given in, Dr. Maclagan was cross-examined as to the processes used in his analysis, but nothing of importance was elicited. In re-examination, he stated that the quantity of antimony in the intestines, estimated by the portion submitted to analysis, was 5·712, or nearly six grains.

Dr. Frederick Penny was then examined on his reports and experiments. In addition to the antimony found in the bottle of Battley's solution, he had by further experiments discovered the presence of aconite. He detected it by applying an extract, obtained by evaporation, to his tongue, when it produced the tingling and benumbing sensation characteristic of aconite. A further portion was treated with ammonia and diluted hydrochloric acid, on the evaporation of which it produced the same sensations strongly and distinctly. He had added 10 per cent. of Fleming's tincture of aconite to Battley's solution, which produced the same sensations very much stronger. He concluded that the solution given to him for examination contained more than 5 and less than 10 per cent. of tincture of aconite. Witness then described a series of experiments made by him on rabbits with Battley's solution, as purchased by him in various places in Glasgow and London, with the solution with tincture of aconite added by himself, and with the mixture under investigation. The various preparations had been injected under the skin of the back of the rabbits, between the skin and the muscles. With the genuine Battley the rabbits assumed a prone position, resting on the belly and chest, and the head invariably resting on the ground. The fore legs were either sprawling or gathered under the body, the hind legs lying extended sideways; the eyes remained open, and the pupils were natural and not contracted. The breathing was invariably gentle; no cries were uttered; no convulsions or spasms of the body were apparent. There was a complete condition of inanity, and with the exception of the open state of the eyes, the animals seemed to be in a state of perfect sleep. In this state the animals remained for several hours, and then gradually recovered. The effects produced upon the animals by Battley's solution containing aconite presented a striking contrast to the symptoms resulting from pure Battley. Soon after the injection the animal became restless and uneasy, and then began to crouch, resting on its flank, the hind legs extended laterally, and keeping its head erect. It next assumed the sitting posture in an attitude of watchful expectancy, and commenced to twitch its lips and move its jaws as if chewing. Suddenly it staggered and reeled over, quickly regaining its feet; saliva began to flow from the mouth, and soon after piteous and peculiar choking cries were emitted. The head was retracted, and the breathing was painfully laborious. Convulsions now set in, followed by intervals during which the limbs were quite relaxed, and the animal lay helpless on its side. Frantic leaps were now frequently taken. A state of utter prostration then occurred, variable in duration, and then a strong convulsion came on, during which, or immediately after, the animal expired, the limbs becoming instantly relaxed. The results produced by this bottle corresponded in every respect with the effects produced by the above mixture, and were so closely similar that it was impossible to detect any essential difference in them. In the case of the small rabbits the experiments were made at the same time, and without knowing beforehand it would not have been possible to distinguish the animal under the influence of this Battley from the one under the influence of the mixture of Battley and the aconite. These results left no doubt in his mind, joined with the sensations, that that bottle contained aconite. All the other experiments, which were numerous and varied, confirmed these results.

In cross-examination Dr. Penny stated that results similar to that produced by antimony under Reinsch's process might be produced by oily matters, but that he would never be satisfied to stop short with that process. In re-examination, he stated that the experiments with the rabbits had been repeated in Edinburgh, in presence of Drs. Maclagan and Littlejohn, with precisely similar results. So far as he could say, the mixture under examination differed only from the genuine Battley in the presence of antimony and aconite.

At this stage, the scientific witnesses, who had been present to hear the circumstantial evidence and the medical reports, were requested to leave the court, as those witnesses were now to be examined on matters of opinion.

Dr. Penny's examination was then resumed.—He stated that the symptoms described as shown by Mrs. Taylor corresponded with the action of tartarized antimony as known to him from study. The powders stated by Dr. Paterson as prescribed by him, and which con ained calomel, accounted for the traces of mercury found in the analysis. The symptoms shown by Mrs. Pritchard also corresponded with those arising from antimony.

Dr. Douglas Maclagan recalled, and shown his chemical report on Mrs. Pritchard's case, said his better acquaintance with the case confirmed the conclusions there stated. The symptoms suggested the administration of antimony at an early period of the illness. Most probably the administration of antimony had been going on the whole time from the commencement of the illness in December. From the evidence given and the symptoms described, he was unable to suggest any other cause for the death. He knew of no natural cause to which the death could be ascribed. Outward application of antimony for a sprain could not account for the death. He never saw anything rubbed on the skin producing any of the constitutional effects of antimony. The powders prescribed by Dr. Paterson would account for the presence of mercury in the body. The history of the case as he had heard it in the evidence decidedly confirmed the conclusions in his report. There was nothing to indicate that Mrs. Pritchard had been labouring under fever of any kind. Being referred to his chemical report on Mrs. Taylor's case, Dr. Maclagan said he was inclined now to think there had been something more than antimony at the last. The symptoms exhibited by her might be produced by aconite. He thought Mrs. Taylor being found suddenly with her head falling, the breathing being hardly perceptible, the pulse almost if not altogether imperceptible, and the generally torpid condition of the brain and the lowered state of the circulation were indications such as would have resulted from aconite; but aconite, like most poisons, varied a little in the effects it produced on different individuals. But these were symptoms likely to have been produced by aconite. He agreed with Dr. Penny in describing the results of the experiments with Battley's solution. Antimony passed pretty rapidly out of the system by vomiting and purging, weakening and ultimately destroying the patient. Opium might lessen the tendency to vomit, but a pernicious effect on the muscular tissue would remain. He had never known a patient under the influence of aconite and antimony at the same time; but if opium, aconite, and antimony were administered so as to be operating at the same time, the symptoms which Mrs. Taylor had exhibited were such as he would have anticipated, because the aconite, being the most powerful, would predominate. There was nothing in her symptoms to indicate apoplexy. That idea was satisfactorily excluded in his judgment.

Cross-examined.—There were no traces of poisoning by opium in Mrs. Taylor. Her symptoms were not inconsistent with her having taken opium, but they did not indicate poisoning by opium. Aconite could not be detected by chymical analysis, and opium was another vegetable poison which was absorbed in the system. A person might be poisoned by opium without any remains in the stomach or the system being detected by chymical analysis. Mineral poisons were more easily detected, and the expectation was that if a person were poisoned by antimony it would be detected by chemical analysis. The contraction of Mrs. Taylor's eyes might arise from opium, but it was an indication of aconite also.

By the Court.—If Dr. Penny's estimate of the amount of aconite in the mixture were correct, Mrs. Taylor might have taken 100 drops to produce the symptoms. A person accustomed to the use of Battley's solution might take 100 drops quite well.

Dr. Henry D. Littlejohn assisted in the *post mortem* examination of Mrs. Taylor and Mrs. Pritchard, and concurred in the reports. He was of opinion that Mrs. Pritchard's death was caused by antimony, administered in small quanties and continuously In Mrs. Taylor's case he had no difficulty in arriving at the opinion that she died from poison, but he had difficulty in determining the particular poison that killed her. He thought the symptoms were mixed in her case, to some extent like those of narcotic poison, and to some extent like those of antimony. Antimony in large quantities would produce a burning sensation in the throat. It could be readily administered in a liquid or beat up in egg-flip. It dissolves readily. Lump sugar, being porous, would easily take up a sufficient quantity of antimony to cause vomiting.

In cross-examination, witness said he had made no special experiments to test this, but, from his knowledge of tartar emetic, he was entitled to make the statement he had done. It was impossible that opium alone could produce the symptoms exhibited by Mrs. Taylor.

Dr. James Paterson, recalled, stated that the evidence he had heard had confirmed the conviction he held in regard to Mrs. Pritchard's case. He was well acquainted with the symptoms of poisoning by antimony, and those of Mrs. Pritchard indicated chronic poisoning by small and repeated doses. It was his decided impression that she was killed by chronic poising by antimony. He thought Mrs. Taylor might have died from opium, but there might be some other narcotic poison. He had made an experiment with aconite, by applying it to his tongue. It produced a strong tingling sensation, accompanied by numbness, which lasted at least four hours. He would never forget the taste while he lived. He had no suspicion of antimony in Mrs. Taylor's case, but he now believed her death had been caused by opium and antimony. A less dose of opium would have a greater effect, seeing the patient was previously under the influence of antimony. The effect would be much more rapid if aconite were also combined.

Evidence was then taken to show that the prisoner's banking account was overdrawn, and that he had obtained advances on his life policy to the amount of £225. Also, that £3000 was held by trustees for the sole behoof of Mrs. Taylor, who had recently desired to give £500 to assist Dr. Pritchard in the purchase of a house, to which the trustees had assented.

John M'Millan, assistant to Murdoch, Brothers, deposed to having filled a bottle with Battley's solution, for Mary M'Leod, on the 28th of February. The purchase of the solution by Murdoch, Brothers, was proved by Mr. Barron, of Barron, Harveys, and Co., wholesale druggists, London, and by Mr. Watts, of Battley and Watts, proprietors of the recipe. The last-mentioned witness declined to state the exact composition of the solution, but said it was a watery solution of opium, and contained neither antimony nor aconite, nor any other poisonous ingredient, except opium. The prisoner's declarations were then read, in which he affirmed that he never administered antimony either to his wife or to Mrs. Taylor, nor any other substance calculated to injure or destroy life. This concluded the case for the prosecution. The evidence for the defence lasted only an hour and a half, and there was no attempt to rebut the medical evidence for the Crown.

John Simpson, druggist, of Duncan, Flockhart, and Co., of Edinburgh, spoke to frequent purchases of Battley's solution having been made from them in Dr. Pritchard's name by a person in Mr. Taylor's employment. In their retail trade they dispensed not less than eighty ounces of Fleming's tincture of aconite in one year. Witness had frequently made up mixtures containing half an ounce. He would not consider it unusual for a medical man to purchase an ounce at a time. In cross-examination witness said there was neither antimony nor aconite in the Battley's solution they sold, and that it was quite impossible they could get into it, even by accident. In reply to the Court, he said the mixture with aconite he spoke of was principally used for heart disease, and that one or two drops of aconite were a dose.

Thomas Fairgrieve, dispensing chemist, Edinburgh, also deponed to Mr. Taylor having made frequent purchases of Battley's solution from him. Sold not less than fifty ounces of tincture of aconite in one year. It was generally made up as a liniment, and in that form he had made up prescriptions containing two fluid ounces of it. In cross-examination, witness said it was not common to sell it unmixed to medical men, though he had done so. He did not think he had ever sold it for experiments in the laboratory. Less antimony was sold now since croton oil came into use, but there was scarcely a day that antimony was not ordered in some shape or other,—sometimes in the shape of tartar emetic dissolved in wine. He might sell one or two ounces in the course of a year, in addition to large quantities mixed with lard sold to veterinary surgeons. The quantity in a prescription for internal use was generally small.

James Thomson, formerly in Mr. Taylor's employment, deponed to having purchased Battley's solution frequently for Mrs. Taylor. The last occasion was the night before she left for Glasgow.

The Solicitor-General said it was his duty, on the evidence they had heard, to press against the prisoner two acts of wilful murder, committed deliberately and with much cruelty on two defenceless women,—the mother being sacrificed while tenderly watching over her child, on whom he was practising his nefarious and subtle arts, urging her slowly but surely to the grave. He pointed out, in careful detail, the circumstances which he held showed that the deaths were not attributable to accident or suicide, but were directly to be traced to the guilty hand of the prisoner. He concluded by asking a verdict of guilty.

Mr. Clark addressed the jury for the prisoner, pointing out the horrible and incredible nature of the crime imputed to a member of an honourable profession, and contended that there was an absence of all reasonable motive for the crime; he also commented on the omission of the Crown to ask Mary M'Leod whether or not her hand had administered the poison. He also remarked that Dr. Pritchard had not prevented, but encouraged his wife getting a nurse and medical advice, and showed that the prisoner had taken no steps to keep people away who might have the means of watching him. He concluded by a pathetic appeal for a verdict of acquittal.

The Lord Justice Clerk, after referring to the great atrocity of the crimes laid to the prisoner's charge, and the singular means by which it was alleged he had perpetrated these crimes, said there were three things of which the jury must be satisfied upon the evidence :—In the first place, they must be satisfied that the deceased died by poison; in the second place, that the poison was wilfully administered for the purpose of destroying life; and, in the third place, that it was the prisoner at the bar who so administered it, or caused it to be so administered. Having gone over the medical evidence in regard to the first question, he said the jury would consider whether it was possible to resist these conclusions—first, that Mrs. Pritchard died from the action of antimony alone, administered in large quantities; and, second, that Mrs. Taylor died from the action of antimony, either alone or in combination with the vegetable of aconite and opium. In the case of Mrs. Pritchard, the evidence of the poison having been taken continuously for a period of months excluded the possibility of either accident or suicide; and, therefore, it seemed impossible to resist the conclusion that the poison must have been administered by some one for the purpose of destroying her life. The character and conduct of Mrs. Taylor, and her general condition of body and mind, were such as not to suggest the idea of suicide in her case as a possibility at all; and whether she died through the influence of antimony administered in several doses, as the chemical reports clearly bore out, or whether her death was brought about immediately through swallowing some of the contents of the bottle of Battley's solution, it was very difficult to understand how her death was brought about by accident. The jury would consider whether they could resist the conclusion that the poison by which Mrs. Taylor was deprived of life was also wilfully given for the very purpose of destroying life. The third question, which was one of vital interest in the case, was whether the prisoner administered, or procured to be administered, to either or both of the ladies, the poison by which their lives were destroyed. His Lordship went minutely into the evidence relating to the illness and death of the two ladies, directing the attention of the jury to the fact, and characterizing it as "a very remarkable circumstance" that throughout, whenever the prisoner had occasion to explain to anybody what he thought was the matter with his wife, he called it gastric fever, when all the symptoms indicated the very reverse of her being under fever. He also pointed out to the jury that the prisoner reported to the registrar that Mrs. Taylor had been under paralysis for twelve hours, which he knew was an absolute falsehood, and that the disease which immediately preceded death was apoplexy, while the medical evidence had demonstrated that there was not a trace of apoplexy in the case. The jury would consider whether in the case of a professional man like the prisoner he could, under the circumstances, if his wife died under the effects of antimonial poison, be so far deceived as to believe she died of gastric fever; after noticing the evidence as to the poisoned cheese, the egg-flip and the tapioca, his Lordship said it appeared beyond a doubt that some one had been practising a system of poisoning, and that in possession of the prisoner were the agents to carry it on. If he understood the theory of the prisoner's counsel right, it was that Mary M'Leod was the person who caused these murders, and that the jury must choose between her and the prisoner at the bar by balancing probabilities; but the prisoner's counsel did not seem sufficiently to advert to the possibility that both might be implicated, and if that was so they could have very little doubt who was the master and who set on the other; but he (the Lord Justice Clerk) did not desire the jury to take this theory, and he thought it quite right that they should consider upon the balance of probabilities which of the two was the perpetrator of the crimes. Was it conceivable that a girl sixteen or seventeen years of age, in the position of a servant-maid, could have herself conceived or executed such a design? And if she had conceived it, could she have executed it subject to the vigilance of the husband of her victim, himself a medical man? That was very hard to believe, indeed. On the other hand, if the prisoner conceived and executed the design, it was not so difficult to believe that Mary M'Leod may have been the perfectly unconscious and innocent instrument of carrying out his purpose. If they were satisfied the murder was committed, the parties who had access to Mrs. Pritchard only could have done it. Some of them were plainly innocent, and in case of others the probability of guilt was reduced to two of these—one or two of them were guilty of the deed.

The jury retired to consider their verdict about twenty minutes past one o'clock, and returned in about an hour with a unanimous verdict of *Guilty* of both charges.

The Lord Justice Clerk then sentenced the prisoner to be executed at Glasgow on the

28th inst., and in passing sentence said that the verdict of the jury proceeded upon evidence which could leave no reasonable doubt on the minds of those by whom it was considered.

The prisoner subsequently made a confession of his guilt, both with reference to the death of Mrs. Taylor as well as that of his wife.

THE BRIGHTON CHEMISTS AND DRUGGISTS' ASSOCIATION.

This society held its annual meeting on Monday evening in the large room belonging to the Lying-In Institution, West Street. Present, T. A. Brew, Esq., President, in the chair; Messrs. Gwatkin, Noakes, Savage, and others. After the ordinary routine business had been disposed of, it was resolved that in future the young men connected with the society should relieve the secretary and treasurer from the onerous duties of collecting subscriptions, etc. The meeting was then made special, to receive a report from Dr. Wood, F.C.S., Professor of Chemistry in the Brighton College, of the result of the second course of twenty lectures which he had given on chemistry, and to award to the successful candidates the prizes offered to the two students who had most satisfactorily answered questions arising out of the lectures, and propounded by Dr. Wood at the termination. The first prize (Dr. Carpenter's excellent work on the Microscope), given by the Association, was awarded to Mr. Edward T. Noakes (the son of our respected neighbour and townsman), who had been the most successful in answering the questions; although the second competitor, Mr. W. T. Aylesbury (apprentice to Mr. Gwatkin), from his previous advantages, displayed superior scientific knowledge on some of the subjects than his more successful rival. However, both candidates merited and received the commendations of Dr. Wood, who took the opportunity of impressing upon his auditors the importance of reading at home the subjects submitted at the lectures, by which means they would better retain them, and at the end of a course would be better able to recall what they had previously learned, and would find themselves generally in a more advantageous position. Dr. Wood did not name the prize he intended to send Mr. Aylesbury. A very agreeable meeting was terminated by a vote of thanks to Mr. Brew.

THE REPORT OF THE SELECT COMMITTEE ON THE CHEMISTS AND DRUGGISTS BILL.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Although I am one of those who did desire that Parliament should be applied to for a Bill to regulate the practice of pharmacy, yet after the weak and impotent conclusions arrived at by the late Select Committee of the House of Commons, I am now of opinion the Pharmaceutical Society will best consult its own dignity, and the interest of its members, by making no further effort in that direction.

I think the Society as a voluntary association may attain greater respect, and confer greater advantages on its members, than it could do if fettered by an Act of Parliament; and by it, be compelled to bring its aims and its objects down to the level of a paltry clique. I would say, rather than do this, let the honourable Society of Chemists and Druggists keep to their career, and their policy; but let the Pharmaceutical Society keep to the elevated and honourable position it has attained.

I deeply regret the labours of the Committee were not continued, so as to have received evidence on the Bill No. 2. Had this been the case, I am strongly persuaded the eyes of the blind would have received light, on two or three important points. Some of the witnesses would have been true representatives of the class.

A Bill founded on the recommendation of the late Select Committee would only have been a delusion and a snare, but of no use in any way. If the grocer and the huckster are to sell all that constitutes the paying part of the druggist's business; but the registered and qualified chemist, who has spent his time in acquiring the knowledge necessary for the safe conduct of his business, and expended his money to obtain the required qualification, is to only have the distinguished privilege of selling a few heroic poisons, the profit of which will scarcely buy him salt to his porridge,—I believe all sensible men will agree with me, that we had better be without the privilege and the Act also. To suppose that a chemist's business consists mainly in selling poisons, shows the profound ignorance of the public on the subject. And so long as this idea prevails in the Parliamentary mind, it will be folly to ask it to legislate for us.

A Yorkshireman.

REVIEWS.

On Food, as a Means of Prevention of Disease. By Erasmus Wilson, F.R.S. London: John Churchill and Sons.

This is the substance of an address delivered at a meeting of the Medical Officers of Health of London, and its gist is simply this:—"Proper food, properly used, produces a sound set of organs, while improper food produces an unsound and a weak organ, and one prone to fall into a state of disease. Now, the chief organs of the body are the brain, the lungs, the heart; therefore our proposition may be varied thus: While proper food produces a sound brain, sound lungs, and a sound heart, improper food produces an unsound brain, unsound lungs, and unsound heart; or, to substitute function for organ, improper food produces insanity, imbecility, consumption, and in the case of the heart, sudden death."

Mr. Wilson then proceeds to refer to milk as the food of the infant man, and shows the importance which attaches to its being given in perfect purity, in sufficient quantity, and with regularity, and proceeds as follows:—

"But a period comes when milk is no longer the diet of children, and when custom, originating, as we have seen, in nature's promptings, has determined the necessity of three meals in the day. The infant demands more than three meals, and makes no distinction between the day and the night. The day of the infant is a day of twenty-four hours; the day of childhood, as of the remainder of life, has a duration of twelve to sixteen hours. The three meals at present under consideration are the morning meal, the midday meal, the evening meal. These meals represent the wants of the body arising during the intervening interval. The morning meal is intended to supply the moderate waste of the night, the midday meal the active waste of the morning, the evening meal the active waste of the afternoon. The amount of the three periods of waste is pretty equal; the amount of the supply should be equivalent to that of the waste.

"I am desirous of impressing upon my hearers my opinion and firm conviction that food is not only a necessity, but in civilized life a threefold necessity, and that the three meals should each represent the third of the nourishment of the day, and be so apportioned as to comprehend an equal amount of variety and an equal amount of nourishment. In the primitive life of the labouring class this law is fully appreciated, and is acted upon to the full extent of their means. With the exception of a somewhat more bulky midday meal, the morning meal and the evening meal do not far diverge from the standard of the midday repast.

"But the educated classes are apt to fancy that they possess a knowledge superior to that of nature, and the result is a perversion of the law of nourishment that leads to the development of debility and disease. A careful, well-meaning mother, from purest ignorance—another expression for superior knowledge, the 'little' knowledge that is so proverbially dangerous—will tell you that she conforms to the law of nature in providing for her children three meals in the day. She will describe those meals as breakfast, dinner, and tea, and you will find the composition of those meals to be as follows:—A vegetable breakfast, namely, bread and butter, with tea and a little milk; a dinner half animal and half vegetable; and a 'tea,' vegetable like the breakfast. Here, then, we find education bringing about a total change in the diet of man. Born an animal-feeder, he is quickly transformed into a vegetable-feeder; that is, more than two-thirds of his diet is vegetable and the remaining third only animal, the exact opposite of that which I consider should be the standard diet of children; namely, one-third vegetable and two-thirds animal.

"My deduction from these premises is, that children are almost universally under-fed, and that the majority of the diseases of children arise from the debility of constitution induced by this habit of under-feeding. If I am right in this view, preventive medicine may do much towards the prevention of disease by correcting an error so widely spread.

"The diet of children of all ages should be, a substantial breakfast, with animal food in some shape; a substantial dinner of meat, vegetables, and cereal pudding; and a substantial supper, also consisting, in part, of animal food. The drink may be milk, tea, cocoa, and possibly beer. I would call this the diet of health; a diet capable of making a strong body and also a strong mind; and a diet capable of preventing disease. Compare it for an instant with the milk-and-water and bread-and-butter diet of some establishments; the meagre dinner of meat, and the miserable grouting of rice and amylaceous pulp. Rice and amylaceous food should have no place in the diet of health, but should be reserved for the sick-room.

"Born in prejudice and nurtured in prejudice, it is the struggle of a lifetime to throw off the trammels of prejudice. We are apt to attach a peculiar signification to the terms which we are in the habit of employing. Ask a person what he usually takes for breakfast, and he will pretty certainly begin his enumeration with the word 'tea,' the mere drink of the meal; it is, in truth, with him a mere break-fast, instead of being, as it ought to be, a substantial morning meal. The dinner of labour is the luncheon of fashion; then follows the mildly alkaline and stimulating drink that is termed 'the tea;' and last of all comes the supper, the late dinner of fashionable life. We have, therefore, before us a succession of three meals and an intermediate drink, but the drink precedes the last meal; and, therefore, the orderly matron, who is more attentive to her one, two, three, than she is to the intention of the daily fare, prescribes for her children breakfast, dinner, and tea—two slops and a meal. But let her, in good English phrase, call the children's meals breakfast, dinner, and supper, and then we immediately obtain two dinners and one slop, the breakfast—an obvious improvement. I have secured to many a child a reasonable evening meal by suggesting to the mother the mere use of the word 'supper' as the name of the third meal. No human being could call bread-and-butter and tea by the hearty name of supper.

"Assuming that the amount and richness of the supply of food should be determined by the offices which it has to perform, there is no period of life when more food is required than in childhood and youth. The hard-worked labourer in a long summer's day scarcely exhausts a greater quantity of nutritious matter than a growing boy of ten or twelve years of age; in the labourer the consumption is waste; in the growing boy it is bestowed in the construction of the body, in developing and building up the future man. And it is no uncommon thing to find that although the general construction of the body has been fairly performed, there is some one organ of the economy that has fared less well than the rest, and that part not uncommonly the skin; hence the origin of acne, of the ringworms, *et hoc genus omne.*

"If it be admitted that food is the source of the elements of which the body is composed, what kind of body can be expected in the case of a deficient supply of food, whether that deficiency proceed from actual want or from some perverse theory of refinement founded on a false conception of the nature and objects of food and ignorance of its direct convertibility into the flesh and blood of man? Parents are too apt to take their own stomachs as the standard of diet of their children: a cup of tea and a slice of toast suffices for them, so it must suffice for the little ones. I knew a lady who brought up her children on mutton alone, because she herself could digest nothing but mutton. Her children were a feeble, puny, sheepish race, always in the doctor's hands. A mother, in anticipation of the full meal at seven o'clock, can afford a light lunch; but she unfortunately concludes that, because a light midday meal is good for her, a spare dinner is equally proper for her children. She has heard somewhere that suppers are heavy and interfere with sleep; so the children must be content with their tea, and go supperless to bed. Parents have rights over their children, but not the right of feeding them in such a manner as to make them the subject of disease. Such parents become the authors of a puny and degenerate race, and are unintentionally traitors to their country.

"If the two periods of life already adverted to be important in their influence on the future man—namely, the period of infancy, ranging from birth to the age of two years, and the period of childhood, ranging from two years to seven years—the next two periods—namely, those of boyhood and youth—are equally so. While the food of the infant and the food of the child are abundant and regular, the food of the boy and the food of the youth should be the same. Both are occupied in the great business of growing life; on both are dependent the future man, for his strength and for his manhood.

"Boyhood and youth have besides other duties to perform—namely, cultivation of the mind, or education; and then the question arises whether these two important processes are equally provided for in the training of our youth. To be well instructed mentally, youth must be properly fed physically; and at no period of life are the three ample meals of mingled animal and vegetable food so necessary. There must be no putting off of the stomach with bread-and-butter and slop as the effigies of two of the three meals of the day; but a generous intermingling of all the elements that constitute a sound and nutritious diet."

We commend this address to the attentive consideration of our readers, for all must feel a deep interest in every question which has reference to the health and vigour of the rising generation.

Report on the Cheap Wines from France, Italy, Austria, Greece, and Hungary, their Quality, Wholesomeness, and Price, and their use in Diet and Medicine; with Short Notes of a Lecture to Ladies on Wines, and Remarks on Acidity. By Robert Druitt, Member of the Royal College of Physicians, London; Medical Officer of Health to St. George's, Hanover Square, etc. etc. London: Henry Renshaw, 356, Strand. 1865.

The causes which led Dr. Druitt to prepare and publish this report will best appear from the following extract from the Preface:—

"For some years I have been deeply interested in the subject of intemperance, its causes and remedies, and in all other matters relating to the popular use of stimulants. Hence I watched with intense curiosity the results of the late reduction of the wine duties, for I had always believed that health and morality would be largely promoted by the more liberal use of wine, and by taking from people all excuse for drinking distilled spirits. Whilst, therefore, one set of prophets were foretelling the day when all the English should give up their beer, and cabmen call for claret instead of 'half-and-half,' and whilst another set were foreboding a deluge of some red sour poisonous stuff that should set our teeth on edge, I bought cheap wine from time to time, for my own table, at such a variety of shops as should enable me to form a notion of what the public could really get at a moderate price, that is, at or under half-a-crown a bottle. After a while, I began (Jan. 1863) to make memoranda of the qualities of what I was drinking; and after these had accumulated sufficiently, began to publish them in the 'Medical Times and Gazette.' Having begun, I soon found myself urged to go on by my medical brethren, who also have encouraged me to publish these papers in the present form. Of course, they bear the marks of abruptness and repetition, which could not be avoided in writing hastily from week to week. I have added notes of what I think would be a useful lecture to ladies, should they desire to learn the elements of œnology.

"It is very difficult to put pen to paper without being misunderstood. 'Do you wish,' says one friend, 'the English to give up their beer and become a wine-drinking people?' Certainly not;—for I hold that beer is about the best of all drinks for persons of good digestion, who work hard in the open air. Or, 'do you really advise us,' says another, 'to give up our fine old port and soft sherry, and take to sour, thin Bordeaux?' Certainly not, is my answer. Whoever has good port and sherry, or can afford to buy them, and finds them agree with him, why should he change? A man can but be well off, after all. But I venture to say that there is a large number of persons who are not well off with beer or port and sherry; and these are the persons for whose sake we want the wine which France, Germany, Greece, and Hungary can supply.

"There is the large class of studious, literary persons, clerks, artisans, shopmen, work-women, governesses, and, I may say, people generally, who lead indoor town-lives, who can't drink beer with due regard to health. Then good port and sherry, if attainable at all, are ruinously dear, and cheap port and sherry very bad. Besides, most men of forty say they can't drink port; and most physicians find that sherry, as it now is, does not agree with the dyspeptic. The two cardinal points of man's moral nature, therefore—his stomach and his purse—demand a change. And what shall we go to? To spirits and water? or to the drugged, factitious liquids sold as cheap sherry? No, common sense says, let us take to Wine; to the true juice of the grape; that liquid which our heroic ancestors drank in the good old times, when villages on the Garonne were called by English names, and when fleets of wine-laden ships sailed from Bordeaux to Southampton—wines which the English loved and drank till they were cut off from them by vile, unphilosophical legislation."

The report contains a large amount of valuable and interesting matter, written in a readable manner, and we recommend its careful perusal to our readers; the majority of whom, from the nature of their pursuits, are obliged to spend the greater portion of their time indoors.

Obituary.

WILLIAM FREEMAN DANIELL, M.D., F.L.S., ETC.

We have to announce with great regret the death of Dr. Daniell, which took place, after a long and painful illness, at Southampton, on the 26th of June last.

We believe that Dr. Daniell was born at Liverpool, in the year 1818, so that he would have been forty-seven years of age at his death. In 1841 he became a Member of the Royal College of Surgeons of England, and shortly afterwards entered the Medical Department of Her Majesty's Army. He then served the whole of his time as Assistant-Surgeon on the pestilential coast of Western Africa, and obtained his promotion to the rank of Staff-Surgeon to Her Majesty's Forces on his return to England in 1853. About this period he was also elected an Honorary Member of the Pharmaceutical Society of Great Britain. He afterwards proceeded to the West Indies, where he served for some years. In 1855 he was elected a Fellow of the Linnean Society, and in 1857 a Fellow of the Royal College of Surgeons of England. In 1860 he accompanied the "Expeditionary Force" to China, and was present at the taking of Pekin. A short time after his return to England from China he went to the West Indies, and returned from Jamaica in September last, with his constitution completely broken up by the climate and by his devotion to scientific studies; and, although he rallied to some extent for a short period, no hopes were entertained of his ultimate recovery, and he died, as already stated, at Southampton in June last. He was buried at Kensal Green on July 3rd.

In the death of Dr. Daniell the Pharmaceutical Society loses a valued contributor to its Journal and Museum, and one who will not be readily replaced. His first contribution to the Journal was in February, 1850, "On the D'Amba, or Dakka, of Southern Africa," after which he contributed papers "On Zea Mays and other Cerealia of Western Africa:" "Synsepalum dulciferum, or Miraculous Berry of Western Africa;" "Sanseviera Guineensis, or African Hemp:" "Pterocarpus erinaceus, or Kino-tree of West Africa;" "Katemfe, or the Miraculous Fruit of Soudan;" "Ethiopian, or Monkey Pepper;" "Cubeba Clusii of Miquel, the Black Pepper of Western Africa;" "Frankincense-tree of Western Africa;" "Amoma of Western Africa;" "Egusé Oil, a New Vegetable Product from Western Africa;" "Cœlocline polycarpa, the Beberine or Yellow Dye Tree of Soudan;" "Copals of Western Africa;" "Red Canella Bark from the West Indies;" "African Turmeric;" "The Cascarilla and other Species of Croton of the Bahama and West India Islands;" "Kola Nut of Tropical West Africa," etc.

This list, which contains many valuable contributions, is more especially so to us, as many of the specimens which served as the materials for the papers were afterwards presented to, and are now preserved in our Museum. The many specimens which Dr. Daniell brought to this country also formed materials for valuable papers by Mr. Bennett, of the British Museum, and other well-known botanists.

Dr. Daniell was also a Fellow of the Royal Geographical Society, and was a contributor to the Journal of that Society, as well as to the Proceedings of other societies, and to several periodicals. He was also well acquainted with the native languages of many of the African tribes, and is said to have had some knowledge of Arabic; and in 1849 he published a volume on the "Medical Topography and Native Diseases of the Gulf of Guinea." This work is highly spoken of by those competent of forming an opinion on the subject.

From the above summary of his communications, etc., it may be seen that Dr. Daniell was indefatigable in his labours and researches while on service abroad and at home, and we can only now deeply deplore that one who had not only enlarged the boundaries of science himself, but had also enabled others to do the same, has been removed from us at such an early age.

At Harcourt Place, Scarborough, June 29th, died, John Coverley. He had been a member of the Pharmaceutical Society since 1842, and was elected a Local Secretary for the present year.

MISCELLANEA.

Phenic Vinegar.—Dr. Quesneville gives the following recipe for an *antipestilentiel.* Take acetic acid (5°), 900 grammes; camphor in powder, 5 grammes; crystallized phenic acid, 100 grammes. This combination of three antiputrescents is said to be extremely useful, and for hygienic purposes far superior to *vinegar of the four thieves*, as toilet vinegar was once called. It has been used a good deal on board ship to keep the cabins of sick persons sweet.—*Moniteur Scientifique*, 1865, p. 515.—*Chemical News.*

Preparation of Gold Purple for Gilding.—Brescius states that gold may be easily obtained in this convenient form by precipitation in the cold from an alkaline solution by means of oxalic acid. He dissolves four ounces of gold in a mixture of two pounds nitric acid (sp. gr. 1·2) and one pound hydrochloric acid (sp. gr. 1·12). To this solution he adds another, made by dissolving pure potash, or, at all events, potash free from silica, in five or six parts of distilled water. After filtration, this latter solution is gradually added to the gold solution. The mixture is now diluted with eight pounds of distilled water, and then a clear and cold solution of one-third of a pound of oxalic acid is stirred in, care being taken not to rub the sides of the dish with the rod. In this way a bulky, spongy, black precipitate is obtained, which must be allowed to settle. and then be well washed and dried.—*Dingler's Polytech. Journal*, Feb. 1865.—*Chemical News.*

Scientific Jottings.—M. de Mortillet has published in the 'Sud-Est,' a Grenoble paper, a curious remedy for the sting of a dangerous insect. It is the application of the wax of the ear to the injured part. This simple remedy he positively asserts, will cure the deadly sting of a poisonous fly, which would otherwise produce carbuncle. Whatever may be the efficacy of this treatment, there can be no harm in trying, the substance being always at hand. Should it not succeed, the patient will always be in time to have recourse to a more radical treatment.—The following is a receipt for an indelible black ink to be used for writing on zinc:—Take 30 parts of verdigris, 30 of sal-ammoniac, 8 of lamp-black, 8 of gum-arabic, and 300 of water; dissolve the gum in the water, and pour it over the other ingredients, well mixed and reduced to powder. A quill pen should be used for writing.—It is with great regret we see the flowers of a fine nosegay fade away in the course of a day or two, notwithstanding the care we take to change the water in which we have put them. The 'Mémorial des Deux Sèvres' informs us that if a good spoonful of charcoal powder be added to the water the flowers will last as long as they would on the plant, without any need of changing the water or taking any trouble at all.—It is stated by several agricultural journals that by watering plants with sulphate of iron most extraordinary results may be obtained; beans, for instance, will grow to double their size, and acquire a much better taste; the same is the case with pears and other fruit. Water kept in a tub with a quantity of old nails in it may also be used for watering with good effect.—Dr. Gibert, a few days ago, read a report to the Academy of Medicine on a paper sent in by Dr. Chevandier, of Die (Drôme), on the use of a turpentine vapour bath in cases of rheumatism, gout, pulmonary catarrh, cramps in the stomach, etc. The patients are exposed for half an hour to the action of the aromatic vapours evolved during the combustion of resinous shavings of the Mugho pine, by means of special fumigatory apparatus. The temperature should never fall below 45 deg. Réaumur (134° Fahrenheit).—*Times.*

New Remedy for Dysentery.—Mr. William Kerr, surgeon, in a paper published in the 'Edinburgh Medical Journal,' recommends the following combination in cases of dysentery, and states that it has been in use for seven years with great success. The constituents are as follows:—"Four officinal, viz. opium, stramonium, dulcamara, digitalis; three non-officinal, Sium lineare, Cicuta maculata, Conioselinum canadense." For infants, generally, squill is substituted for digitalis. "Excepting opium, the part employed is the leaf. Digitalis and squill are combined in the proportion of half a part each, all the others in that of one part. For infants, opium is reduced to half a part. The usual dose to adults is six and a half grains, digitalis or squills being each half a grain, all the others one grain each."

BOOKS RECEIVED.

The Half-Yearly Abstract of the Medical Sciences. January to June, 1865. London: John Churchill and Sons, New Burlington Street; Edinburgh: Maclachlan and Co.; Dublin: Fannin and Co.

A Course of Practical Chemistry. Arranged for the use of Medical Students. By William Odling, M.B., F.R.S., etc. Second edition. London: Longmans, Green, and Co. 1865. 8vo, pp. 241.

On the Ultimate Nerve-Fibres distributed to Muscle and some other Tissues, etc. etc. Being the Croonian Lecture for 1865, delivered by Lionel S. Beale, M.B., F.R.S., etc.

A Course of Lectures on Hydrophobia, its History, Pathology, and Treatment, etc. By T. C. Shinkwin, M.D., M.R.C.S.L. Dublin: printed by Thomas Deey.

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.

Licence for the use of Stills or Retorts.—As several of our correspondents appear to be under the impression that it is not necessary to take out a Licence for the use of Stills or Retorts, we beg to call the attention of our readers to the subject, and remind them that in all cases where stills or retorts are used *for the purposes of trade*, it is necessary to take out a licence, the cost of which is 10*s*. per annum. For the words of the Act relating to the above, see vol. iii. (2nd series), page 202.

"*Nervine Balsam.*"—Mr. Applegate (Upper Holloway), in reply to a correspondent in our last number, sends the following formula for "Nervine Balsam," said to be one of the ingredients of "Dupuytren's Pomade," from Beasley's 'Receipt Book':—Beef marrow, oil of mace, āā 4 oz., melt together, then add balsam tolu 2 drachms, oil of cloves, camphor, āā 1 drachm, dissolved in ½ oz. of rectified spirit, and mix.

Y. O. U. (Newport, Mon.)—(1) The two are synonymous. (2) Creasote may be made into pills with bread-crumb.

"*Adolescens.*"—(1) As the first work mentioned is the text-book in use, it would be better to obtain it through any bookseller. (2) Morton's 'Manual of Veterinary Pharmacy.' (3) We think not.

A. P. S. (Edinburgh).—Apply by letter to the Director-General of the Medical Department of the Navy, Somerset House.

"*Quæstor*" (Sheffield).—*Crystalline constituents of plants.* See papers on this subject by Dr. Attfield in this Journal, Vol. III. (2nd series), page 447, and Vol. VI. (2nd series), page 212.

"*Legality.*"—No. The article in question is not liable to the Patent Medicine Duty.

"*Juvenis,*" "*New Student.*"—Fownes's 'Manual of Chemistry' and Bentley's 'Manual of Botany' are the text-books in use.

A. P. S. (Rochdale).—(1) Wishes to know of a cheap mode of bleaching resin. (2) *Magnesiæ Carbonas.*

Mr. Atkins (Salisbury) wishes to correct an erroneous statement which has been published, to the effect that his recent loss by fire was covered by insurance. This is not the case; the insurance policy not covering more than one-third of the amount of loss.

"*Pharmaceutist.*"—*Ammoniated Solution of Quinine.* Vol. XIII. page 344.

B. P. (Newcastle on Tyne).—*Betts's Patent Capsule.* See page 41 of our present number.

J. W. L. (Birmingham).—Messrs. Horner and Sons, Bucklersbury.

Mr. Johnson 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. VII.—No. III.—SEPTEMBER 1st, 1865.

PROCEEDINGS RELATING TO ALLEGED INFRINGEMENTS OF BETTS'S PATENT FOR METALLIC CAPSULES.

The Chancery suits commenced by Mr. Betts, against vendors of articles to which metallic capsules were attached, which he alleges to be an infringement of his patent, remain *in statu quo;* and although some communications have passed between the plaintiff and defendants and their solicitors, we cannot say that there is any prospect at present of such an arrangement being made as would exempt dealers in capsuled articles from liability to proceedings similar to those recently instituted and now pending. The committee of persons interested in this subject, to which we alluded in our last publication, have had several meetings, and the communications that have been read at these meetings show that the interest felt among retailers of capsuled articles is both deep and widely diffused. The committee have very judiciously abstained from adopting or recommending any proceedings of a hostile character, believing that Mr. Betts must see the folly of persisting in the persecution of innocent dealers, and that some satisfactory arrangement might be made to secure themselves and their brethren from such annoyance for the future. The proceedings of the committee, however, passive as they have hitherto been, and the stand made by the defendants who have put their cases into the hands of Messrs. Flux and Argles, have no doubt proved highly beneficial in preventing a more general and continued attack upon retail dealers. We have not heard of any fresh cases in which proceedings have been instituted, although it would appear from information we have obtained that a system was commenced and in progress which, if it had not met with a firm resistance and unqualified condemnation, would have involved hundreds of innocent tradesmen in ruinous law proceedings. It would be small consolation to these men to tell them that they have a remedy against those who supplied them with the goods. We have heard this remark made by those who ought to know that such a remedy would, at best, be something like the ten shillings damages given to a plaintiff to carry the costs of the suit. A remedy against those who supplied the goods! But it would be necessary first to know what goods the proceedings relate to, and this is just the sort of information that the bills in Chancery do not disclose. Defendants are accused of using or selling metallic capsules made by Mr. Betts's process, and not of his manufacture; but they are left to guess when, where, and how the offence was committed. Was it the bottle of Vichy water sold the other day, or the bottle of eau de Cologne unsuspectingly procured specially for a very particular customer; or was it a bottle of Price's glycerine, or Rimmel's toilet vinegar, or Burnett's disinfecting fluid; or was it some chóice anchovy paste, or French mustard, imported from abroad? These are questions which a defendant finds it difficult to decide, and the plaintiff is not disposed to help him. You have your remedy against those who supplied you with the goods; so also has Mr. Betts, and if they are guilty parties *he* would be justified in proceeding against them; but it is hardly to be expected that you should undertake a number of speculative actions to supply the information required for Mr. Betts. If the defendants in those Chancery suits were fond of law, they might seek compensation for the annoyance and expense of such proceedings by each engaging in half-a-dozen or a dozen speculative actions in the Queen's Bench or Court of Exchequer, which would no doubt be very good for the lawyers.

Such a method of meeting the case, although it has in two or three instances been suggested as the proper course, would have been most uncongenial and insupportable to the class of men who constitute the defence Committee and the defendants to the pending suits. The Committee have adopted the more judicious course of disclaiming any intention to infringe Mr. Betts's patent, or any knowledge of such an infringement having been involved in the acts of which defendants are accused. They have appealed to Mr. Betts's sense of justice, in claiming to be exonerated from any guilty knowledge, or from being visited with proceedings which they feel to be unmerited. It should be understood that the Committee and those in whose interest they act, consist entirely of such dealers in capsuled articles as have never knowingly infringed Mr. Betts's patent. Their object is not, and has not been, to encourage those who would deprive a patentee of his legal rights, or to screen the guilty from merited punishment, but to protect themselves and others similarly circumstanced, from proceedings which they consider to be uncalled for, unjust, and oppressive. For this purpose a fund has been established, called the "Guaranteed Defence Fund," to which there are a large number of contributors of sums ranging from £100 to £5 or less; the object of the fund being to meet the necessary expenses involved in the defence or protection of those dealers in capsuled articles, against whom proceedings are, or may be, instituted, but who, if offenders at all, have only been so unwittingly or unintentionally. The subscribers to the fund will only be called upon to contribute such an amount as may be required, in sums proportional to those set against their names. It is, of course, hoped that no further legal proceedings will be rendered necessary. Everything that could be consistently done, has been done, with the view of bringing the case to a satisfactory issue, but nothing conclusive has been arranged, although further proceedings in Chancery have been stayed pending negotiation. The following note from the Solicitors to the Pharmaceutical Society, addressed to the Secretary, will explain the present position of the case, and their opinion with reference to the course that ought to be adopted :—

"1, *East India Avenue, Leadenhall Street, London, E.C.*
August 17th, 1865.

"*Mr. Elias Bremridge, Secretary to the Pharmaceutical Society.*

"Dear Sir,—We beg to acknowledge receipt of your note, requesting us to advise whether capsuled articles can now, with safety from suit, be taken into or kept in stock.

"We are not in a position to report the termination of either of the numerous Chancery suits relating to capsules in which we appear for the Defendants. Probably the defence will be successful; and there exist grounds for believing that the Plaintiff will abandon his suits, and perhaps promise not to institute other like suits against retailers (to the present time) of capsuled articles; but nothing definite has been arranged, and we cannot modify the opinion expressed in ours of the 22nd July, to the effect that 'the only course now really safe from the annoyance of suit is neither to take nor keep in stock any capsuled article.'

"Each dealer in articles capsuled has it in his own power to guard against the possibility of being annoyed by suit; he cannot be protected if he will not guard himself.

"We are, dear Sir, yours truly,
"FLUX AND ARGLES.

"P.S. We cannot advise that retailers in the Colonies are free from the annoyance of Suits. F. & A."

At the last meeting of the Committee it was decided to hold a public meeting of chemists and druggists, perfumers, and patent medicine dealers, at 17, Bloomsbury Square, on Thursday, the 5th of October, at eleven o'clock, to take into consideration the present position of these trades in reference to the sale of capsuled articles. It was also decided that 10,000 copies of the following notice to the public should be printed and supplied to those who may make application for them :—

"NOTICE TO THE PUBLIC.

"As the retailing of articles covered with metallic capsules has exposed sellers, and may expose buyers, to suits in Chancery, articles which have hitherto been sold so covered are now sold here *not capsuled.*"

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *2nd August*, 1865,

Present—Messrs. Brady, Davenport, Deane, Hanbury, Hills, Morson, Orridge, Sandford, Savage, and Squire, The following were elected

MEMBERS.

Bindloss, George Frederick .... London.
Chave, William F. .... Hereford.
Jones, Thomas .... Putney.
Oliver, Josiah .... Hadlow.
Stevenson, William Law .... London.
Swift, Francis .... Spalding.

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 4th October next, when the successful competitors will be expected to attend.

It was resolved—"That the Director of the Laboratory be required to mark off the names of the Students in an Attendance Book, twice daily. That those not then present in the Laboratory be noted as absent. That the Attendance Book be laid before the Laboratory Committee at their monthly meetings, and that the Secretary be requested to send an abstract thereof (if the Committee deem it desirable) to the parents of or those immediately interested in the Students, adding also an abstract of the attendances at the Professors' Morning Lectures. That Certificates of Attendance be given to those who enter the Laboratory for three months and upwards, provided their attendances are regular, and that the Director report favourably as to their attention and diligence. That Certificates be given to those only who attend at least three-fourths of the Lectures delivered in the period for which they enter. That the copper-plate form of Certificate at present in use be confined to attendances for an *entire course* of Lectures, and that a small letter-press form be given to those who attend portions only of such Lectures."

BENEVOLENT FUND.

The sum of Ten Guineas was granted to Mrs. Walton, from the Benevolent Fund, towards the expenses attending the admission of her child into the British Orphan Asylum.

COMMUNICATION FROM GERMANY.

It was resolved—"That the letter received from Dr. Rieckher, at Marbach, Würtemberg, relative to the meeting of the Apotheker-Vereins in Brunswick, in September next, be entered on the minutes, and that the Secretary be instructed to reply as follows:—That whilst this Society estimates highly the proposed objects of the Union, and would gladly give any facilities in its power to their prosecution, it is scarcely within its functions as a corporate body to appoint representatives thereto. They would, however, draw the attention of the Union to a voluntary association existing in this country under the title of the British Pharmaceutical Conference, one of whose objects is a correspondence with societies with similar aims in other countries, to whom such a communication might be addressed. This being done, the Pharmaceutical Conference would probably arrange, if practicable, to co-operate in some way at a future meeting.

"Copies of the letter and circular and of this minute to be forwarded to the Secretary of the British Pharmaceutical Conference."

Das Oberdirectorium des Süddeutschen Apotheker-Vereins to Elias Bremridge, Esq., Secretary, London Pharmaceutical Society.

Sir,—As chief director of the Southern German Apothecaries' Union, I beg leave to send you the programme for the International Congress in Brunswick, requesting you at the same time to communicate it kindly to your honoured Pharmaceutical Society in London, so that at least three deputies on your part might be sent to the Congress. The questions raised in the programme are of such importance for our Pharmaceutical conditions and affairs, that the attendance of deputies from all the States of Europe appears to be highly desirable, if not absolutely necessary. We hope that your Society will approve of our project, and resolve to be represented at the Congress no less than other States, as Russia, France, Austria, Switzerland, and others have already done. The manner of acquainting the members of your Society we must leave to yourself. In case that you should consider a publication of the programme in the 'Times' as necessary, I should feel much obliged to you if you would kindly favour me with a copy of the number in which it appears.

This opportunity being offered to me, I have the pleasure to express my highest esteem for your Pharmaceutical Society, and begging you for a speedy communication of your resolution,

I have the honour to be, Sir, yours very respectfully,

Marbach, 13*th July*, 1865. DR. RIECKHER.

Programme for the Pharmaceutical Congress to be held at Brunswick on the 15*th*, 16*th*, *and* 17*th September*, 1865.

In the last general assembly of the General German Apothecaries' Union at Wiesbaden, a committee, consisting of members of several Apothecaries' Unions, proposed to establish an *International Congress* of all the Pharmaceutical Unions, which was approved of, not only by the members of the General German Apothecaries' Union, who were present at the meeting, but the realization of such an International Congress was also resolved on afterwards by a number of other Unions.

The purpose of the Congress is the common consultation about the following generally important questions of the Pharmaceutical profession, viz. :—

1. How and by what means can the scientific cultivation of Apothecaries be preserved and forwarded in the surest manner?

2. How is the want of Assistants to be remedied to the advantage of both parties?

3. Will subsidies and pensions really be able to effect what is expected of them?

4. What remedies are to be applied, to secure for practical Pharmacy a corresponding position in all directions?

5. What position does Pharmacy occupy with reference to the liberty of trades?

6. How is it possible to realize by degrees a uniformity in the prescriptions of the Pharmacopœias for galenical preparations?

7. Is it desirable that the metric system of weights should be introduced by all the Apothecaries, and how is this to be attained in the most simple manner?

8. Would it answer the purpose to write all the Pharmacopœias in the Latin language, and how is this to be attained?

9. By what means can Pharmaceutical charlatanry be opposed, and how is the trade in secret remedies to be reformed?

10. How is the sale of poisons to be regulated so as to prevent abuse dangerous to life and health, and at the same time not to render useful application of poisons too difficult?

The several Unions, however, that have already promised their participation in this progress, as well as those that intend to do so afterwards, are empowered to propose other questions of general interest for consultation.

The town of Brunswick has been chosen as the place of meeting, and the time of the meeting is the 15th, 16th, and 17th September, 1865.

Reserving for ourselves the communication of a more accurate programme for the course of the consultations immediately before the meeting of the Congress, we beg leave to point out in general as leading points the following :—

The meeting is one of all the Pharmaceutical Unions destined to cause an exchange of their opinions; it is presumed that the deputy of each of them will represent the expression of the views of the members. Every Pharmaceutical Union legally acknowledged by the Government of its respective country, is permitted to send deputies from among its members to the Congress; but also deputies of all the Pharmaceutical Unions of the world are entitled to appear in the Congress, and to partake in the consultations.

Although the number of partakers in the Congress is unlimited, yet a certain uniformity is to be observed in voting. Every State in Europe in which there are Pharmaceutical Unions, is permitted to delegate three deputies, who have a claim to voting. Thus, Northern and Southern Germany, Austria, Russia, France, England, Belgium, Switzerland, Holland, etc., can send three deputies each, who have the right of voting. One member of the Congress can represent *one* country only, so that countries not sending any deputies cannot give their votes. In order to avoid misunderstanding and trouble, every deputy before receiving a card of admittance has to deliver up a written certificate, which certifies him as a representative of the Union of his country.

In the first meeting a president and vice-president will be chosen for the direction of the consultations, likewise three secretaries for drawing up the protocols; the functions of the latter will continue during the time of the Congress, and it will be their duty to compose the reports of the sessions.

In the same meeting a committee is to be chosen for each of the questions which are to be decided, and it has to prepare the objects of discussion for the meeting.

To the sessions of the different committees, which have to choose among themselves a chairman, only members of the same will have admittance.

The consultations are to be carried on generally in the German language, but speeches may be made as well in the English and French languages.

The local preparations for the Congress will be managed by a committee of Brunswick colleagues; for any particular wish, application is to be made to "Herrn Director Herzog, at Brunswick." Propositions in reference to the consultations are to be addressed to the Directors of the Southern and Northern Apothecary Union (for addresses see below).

Invitation to join the International Congress.

No field of science and art is so much in need of a uniform and consonant treatment as that of Pharmacy. Differences in this field but too often endanger life and health. All the true professors of Pharmacy will therefore shun no sacrifice, in order that the Congress may be called into life, which the above programme aims at, and the purpose of which is to abolish any baneful evils existing in the Pharmaceutical calling. We urgently invite our honoured colleagues in the east and west, north and south, to join in this undertaking, both in the interest of "suffering humanity" and in the interest of our art and science.

The General Assembly of the Apothecaries' Union in Northern Germany will be followed by the International Congress, and afterwards, from the 18th to the 24th of September, a meeting of the German Naturalists and Physicians will take place at Hanover.

The representatives of the General German Apothecaries' Union are:—

Dr. Bley, Bernberg, Anhalt.
Dr. Rieckher, Marbach a. N., Würtemberg.
Dr. Geiseler, Königsberg, Neumark.

The following were omitted from the list of members published in the July number of the 'Pharmaceutical Journal':—

Page xxi: 1841 | Foster, Frederick...Brighton.
" xliii: 1862 | 718 | Gowland, William...Sunderland.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE ESTIMATION OF NITRITE OF SODA.

BY MR. JOHN T. MILLER.

When a dilute solution of a nitrite is dropped into a solution of permanganate of potash to which some sulphuric acid has been added, the colour of the mixture fades and finally vanishes. This effect is owing to the reduction of the permanganic acid by the NO_3, which by combining with two equivalents of oxygen is converted into NO_5. Taking nitrite of soda, the decomposition may be thus represented:—

$$5Na,NO_3+2(KO,Mn_2O_7)+11SO_3=$$
$$5NaO,SO_3+2KO,SO_3+4MnO,SO_3+5NO_5.$$

This reaction forms the basis of a ready volumetric method of determining the amount of real nitrite in crude nitrite of soda. The presence of nitrate and carbonate of soda, or caustic soda, is immaterial.

For example, it was required to know the percentage of nitrite of soda in a specimen of the crude salt, which had been made at a *low temperature* by the process of the British Pharmacopœia. A solution in water, containing 50 grains of the sample in 1000-grain measures, was prepared. Each decem (10-grain measure) contained, therefore, 0·5 grain. The strength of the solution of permanganate of potash was such, that to convert 4 equivalents or 112 grains of iron from the state of protosalt to that of persalt, 627 decems of it were required. This quantity, then, would be decolorized by 1 equivalent or 69 grains of nitrite of soda.

Ten decems of the permanganate solution were accurately measured with a pipette, transferred to a beaker, and mixed with 2 ounces of water and 3 fluid drachms of dilute sulphuric acid.

The beaker being held over white paper, and its contents kept in brisk rotation, the solution of the sample was slowly dropped in—very slowly towards the end of the process—until, on adding another drop, the liquor became colourless.

An inspection of the burette showed that 16·8 decems had been used. Then $0·5\times16·8=8·4$ grains of the sample. And as 8·4 grains decolorize 10 decems, 100 grains will bleach 119 decems. Then—

$$627 : 69 :: 119 : x ; x=13.$$

This specimen contained, therefore, 13 per cent. of nitrite of soda. It also contained 13 per cent. of carbonate of soda.

Having repeatedly obtained results similar to these, previous to the appearance, in the July number of the Journal, of Mr. Warington's interesting communication "On Spirit of Nitrous Ether, and Nitrite of Soda," I was rather surprised on seeing the very different conclusions at which that gentleman had arrived. I tried the starch process carefully, but instead of 75, could find only 11 per cent. of nitrite of soda in the product; while the carbonate of soda present amounted to 13·9 per cent. But is the "basis of calculation" adopted by Mr. Warington quite secure? If we infer the quantity of NaO,NO_3 in the salt employed from the amount of nitrous ether found in the distilled spirit, do we run no risk of estimating *nitrate* of soda as NaO,NO_3?

In order to try this point a few distillations of spirit of nitre were made, the salt used being in each case dissolved in twice its weight of water, as suggested by Mr. Warington.

1. The nitrite of soda for this experiment was formed by keeping the *nitrate* fused for some time at a bright red-heat. When a few drops of sulphuric acid were added to a strong solution of it, ruddy fumes of peroxide of nitrogen appeared in abundance. The oxidation test indicated the presence of 42 per cent

of nitrite. Spirit of nitre prepared with this substance had a specific gravity 0·842, and 2½ volumes per cent. of nitrous ether were separated by the chloride of calcium test.

2. The salt used in this experiment was made by the starch process. The specific gravity of the distillate was 0·847, and the test liquor separated 4½ volumes per cent. of nitrous ether.

3. *Nitrate* of soda was now tried, and when rather more than half the spirit had come over, the reaction became so energetic that it was necessary to suspend the application of heat. The product had a specific gravity of 0·850, and on applying the chloride of calcium test 6 *volumes per cent. of nitrous ether rose to the surface.*

These facts are, I think, a sufficient answer to the above question.

It is supposed that in making nitrite of soda by the Pharmacopoeia method, we shall succeed best by working at a low temperature—avoiding deflagration in fact. In this point of view, the substitution of starch for carbon is an improvement. But here again theory and facts seem to be at variance. Out of a number of experiments, all pointing to the same conclusion, I may mention the following:—When the mixture of nitrate of soda and carbon was thrown into a crucible heated to full redness, the nitrite of soda in the product amounted to 18 per cent.; but the quantity was increased to 24 per cent. by again fusing the mass at a red-heat for about 10 minutes, so as to drive off more oxygen.

A portion of the salt made by Mr. Warington's process was fused in a platinum crucible, and strongly heated for about a minute, so that it effervesced violently. It now contained 34 per cent. of nitrite of soda, or three times as much as before.

Sheffield, August 11th, 1865.

SOME REMARKS ON THE NOMENCLATURE OF THE PHARMACOPŒIA.

BY DANIEL HANBURY.

"Pharmacorum nomina, sæpius licet absurda, sancte servavi, utpote complurium seculorum auctoritate, ratione legibusque exempta."—*Linnæus.*

Some months ago, there was presented to the Pharmaceutical Society by Professor Redwood, a very interesting paper *On the construction of a Pharmacopœia*,* one of the objects of which was to invite suggestions for improvements in a proposed new edition of that work. As almost every pharmaceutist must have made in the course of his experience some useful observation respecting one at least of the 600 drugs and preparations which the Pharmacopœia specifies, it is to be hoped that Professor Redwood's invitation may receive many replies. For one, I beg permission to offer a few remarks on the nomenclature of some of the drugs derived from the vegetable kingdom. It may seem a rather trivial subject upon which to descant, yet it commonly happens that upon the publication of a pharmacopœia the first strictures that appear have reference to changes in nomenclature, which seem the inevitable concomitants of each new edition. Nor is this unreasonable, for the name of a drug is often known and used, when nothing else is known about it, and the convenience and suitableness of a name are points upon which all feel able to give an opinion.

Professor Redwood has touched on this subject in the following judicious remarks:

"It appears to me desirable, as far as possible to avoid the use of che-

* *Pharm. Journ. and Trans.* May, 1865.

mical 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."

It happens unfortunately that many names which are both familiar and concise, are not accordant with modern knowledge, and hence has arisen the feeling that alteration is necessary. The teacher who imparts botanical knowledge, shudders to hear Squill spoken of as "*Radix* Scillæ," or Caraways as "*Semina* Carui," when he is using his utmost endeavours to explain that *bulbs* are not *roots*, and that the so-called *seeds* of umbelliferous plants are in reality *fruits*. Yet terms such as these are in constant use among druggists, and are sanctioned by all the older writers on Materia Medica. The more exact definitions however, having already existed many years in the Pharmacopœia, it would, in most cases, be a retrograde movement to discard them in favour of the older and more popular designations. Let us then accept the *bulbs* of Squill, the *corms* of Colchicum and the *fruits* of Umbellifers, as a token that pharmaceutists do not ignore botany.

In many cases however the designation of the special part of the plant which is to be used, is neither customary nor necessary, while in others it is necessary in order to avoid confusion, or to comply with pharmaceutical usage. In the London Pharmacopœia of 1836, brevity was carried to its utmost limit, the old pharmaceutical names employed in previous editions being often so shorn, as to render them neither elegant nor explicit. Thus, Cajuput Oil was termed simply *Cajuputi*; Gum arabic, *Acacia*; Poppy heads, *Papaver*; Pomegranate peel, *Granatum*;—while *Quercus*, which the dictionary tells us signifies *an oak*, was held to mean *Oak Bark*.

In amusing contrast with this excessive condensation, are the terms employed in the Edinburgh Pharmacopœia of 1817, the authors of which seem to have been impressed with the necessity of each name containing the whole truth, no matter how inconvenient it might be to write it. Hence we find Cajuput Oil under the name of *Melaleucæ Leucadendri Oleum volatile*; Oil of cloves under that of *Eugeniæ Caryophyllatæ Oleum volatile*; Mace is called *Myristicæ Moschatæ Involucrum nuclei*, and Cascarilla, *Crotonis Eleutheriæ Cortex*.

In the British Pharmacopœia, extremes such as these have to a large extent been avoided; but it is still obvious that some greater regard to the usage of pharmaceutists, would impart a practical character to the work. I would not propose to return to the old rule of designating in every case the part of the plant of which each drug consists, for terms such as Benzoin, Assafœtida, or Cubebs are in themselves perfectly explicit. But it would be preferable to say *Belladonnæ Folia* instead of simply *Belladonna*, especially as we have also *Belladonnæ Radix*. *Arnicæ Radix* is more definite than simply *Arnica*; *Filix Mas* than *Filix*; *Quercus Cortex* than *Quercus*; *Cassiæ Pulpa* than *Cassia*; *Acaciæ Gummi* than *Acacia*; *Colocynthidis Pulpa* than *Colocynthis*, etc. Some of the names are also open to exception in other ways:—why should "*Ipecacuan*" be substituted for the more euphonious *Ipecacuanha*, when the latter is the true Brazilian name and is used by the best writers, as well as universally in commerce? Can a good reason be given for changing *Guaiacum* to *Guaiac*? the old term *Matico* might also be restored, for it forms as good a Latin noun as *Bucco*, and is in accordance with its derivation,* which the feminine "*Matica*"

* *Matico* is the diminutive of *Mateo*, the Spanish for *Matthew*, that having been the name of the soldier to whom tradition ascribes the discovery of the styptic property of the drug.

is not. But in making these criticisms it must be admitted that in the large majority of cases, the names employed in the British Pharmacopœia have been well selected, and are as free from objection on the score of ambiguity or inconsistency as any names can be.

In the selection of names to be used, as well as in the introduction of new formulæ, or the omission of old, it appears to me that more regard should be had to existing custom and practice. Thus names that are familiar and in constant use should not be hastily changed; medicines that are hitherto unknown should not make their first appearance in a pharmacopœia; and old medicines which are in daily employment should not be suddenly discarded, or have their composition materially altered.*

OBSERVATIONS UPON THE CONSTRUCTION OF A PHARMACOPŒIA.

BY MR. A. F. HASELDEN.

"Dediscit animus sero quod didicit diu."

To offer suggestions or make remarks upon a work which has been pretty freely dealt with, and is now in the hands of those well qualified to revise it with ability and judgment, might at first sight seem needless, uncalled for, and intrusive; and I should be among the last to appear in the lists under such colours, but I am induced to offer my thoughts upon the construction of a Pharmacopœia, in consequence of the invitation given at the last Pharmaceutical Evening Meeting by Professor Redwood, and seconded by the chairman of the evening, in words suggestive of the French proverb, "Chacun ira au moulin avec son propre sac,"—still more from a degree of pleasure I feel in the matter, and from the additional stimulus that my attempts or contributions are received with consideration and attention, and moreover, now is the time to speak or write, before the next edition of the British Pharmacopœia makes its appearance. No one can, I feel, be justly blamed for stating his ideas, whether correct or otherwise, beforehand, but to wait until the book is out (knowing the probable form it will take), and then suggest or find fault, might well expect to be met with the rejoinder, "Then why not have said so before?" this not applying to any preparations, the introduction of which may be new, and consequently could not be commented upon before their appearance, any more than the present work, before it was published.

To commence then at the beginning: although the die, I feel, is cast, and at the risk of being by some thought pedantic, I have from the first regretted, and do so still, that the British Pharmacopœia was not written in Latin; in that language it would have been read and understood wherever civilization had fixed its stamp, whereas on the European continent in the English language, the number of those who can thoroughly understand it must be limited. Again, there is yet a stronger home reason: I have always looked upon the London Pharmacopœia in Latin, as a link between the school Latin of the apprentice and the Latin of the prescriber; in studying the Pharmacopœia in Latin, two objects were gained,—in the first place, a general knowledge of, and acquaintance with, the different preparations; and secondly, the opportunity at the same time of becoming conversant with words and sentences likely to be met with

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* As illustrations of these latter propositions may be mentioned the introduction of Oil of Elder Flowers into the London Pharmacopœia of 1836; the omission of Compound Extract of Colocynth from that of 1851; the alteration in the composition of the Steel Wine and Ipecacuanha Wine in the Pharmacopœia of 1824; and the augmentation of strength in the *Liquor Ammoniæ acetatis* of that of 1864.

in prescriptions, which neither Cæsar nor Virgil would call to remembrance half as well.

I viewed the translating of the Pharmacopœia as cementing the classical part of the pharmaceutist's education in the same proportion that Materia Medica and Botany cement and complete the education of the pharmacologist, and as Practical Chemistry completes that of the chemist.

As regards the classification of the contents of a Pharmacopœia, the separation of that portion designated Materia Medica from the preparations and compounds, appears to me to be the most desirable arrangement. If the construction of a work upon Materia Medica, or the Natural History of Drugs, were the one under consideration, then I should say, first place the article, and let all the information pertaining thereto, of whatever kind, follow; but it is a Pharmacopœia which is under notice,—a book, I imagine, originally designed, not to give an account of drugs and chemicals, but to place in the hands of the public and private venders and dispensers of medicines certain forms of preparations which should be thoroughly understood and recognized by all prescribers and dispensers, so that the sick might be able to obtain, at all times and in all places, the same preparations of certain drugs. To my mind, it is clear that a Pharmacopœia has more reference to preparations than to the crude drug; but at the same time, that no mistake might occur as to the nature and qualities of drugs and chemicals from which preparations are to be made, a Materia Medica descriptive as far as necessary of those drugs, etc., has generally been added; but the preparations seem to be the most important, therefore I would not confuse them by placing them after the substance, and forming one part with the Materia Medica. On the contrary, I would follow the plan of the British Pharmacopœia, and former pharmacopœias; prescribers and dispensers are alike accustomed to this arrangement, and I have failed to discover any good at all equivalent to the inconvenience of departing from it; the Materia Medica of the British Pharmacopœia, whatever failings may exist, is a decided improvement upon that of former Pharmacopœias, and those who desire to study that portion will find much useful information, opening fields for wider and further researches. But I take it that a medical man, when prescribing, has made up his mind in the first place as to the disease, then whether his remedy is to be internal or external, or a combination of both; should he require an external preparation, in the shape of liniment, ointment, etc., the Pharmacopœia gives under the head of each, various preparations; and he uses them as they are, or adds thereto, according to circumstances; and so if he desires to give a pill, either aperient, opiate, antiperiodic, or tonic, by turning to the pills he can at once select any; so he may make choice of tinctures, infusions, decoctions, confections, powders, etc. It appears more convenient to have a choice of preparations, rather than all the preparations of one particular drug, before the prescriber; and so I, for one, believe in an arrangement which keeps the Materia Medica separate from the Preparations and Compounds, and would confine the Materia Medica as much as possible to the description of drugs, and not preparations; and in the Preparations and Compounds would give the best known form in full use, leaving it to those engaged in large manufactures to produce in their own way, if a better one, a similar or superior article, possessing the same constituents; and I would arrange the work alphabetically, as now.

In the Materia Medica portion I would refrain from adding the various preparations into which each substance enters, as experience has taught me that the addition of them would materially increase the labour of producing the work, and very much enlarge it without a corresponding advantage; take, for instance, aloes,—there are no less than nine Pharmacopœia forms for pills into which it enters, besides the tincture, decoction, and enema; again, soap is an ingredient in seven pills, besides other preparations. Where could be the good of enumerating all these compounds over and over again? The printing of the Materia Medica would occupy at least double the space it now does, and, as far as I can judge, to no useful purpose, if simply to facilitate an acquaintance with the contents of the Pharmacopœia.

With regard to the nomenclature, I can scarcely be said to have an opinion exclusively my own, as it has been so ably expressed by others, and can therefore simply say that I fear the consequences likely to occur from any changes which interfere with the recognized names of medicines, and may further refer to my article on "Names," Vol. I. p. 112 of the 'Pharmaceutical Journal,' second series.

The weights and measures, as at present arranged, answer well for all Pharmaceutical purposes, but I do not believe in the convenience of grains for prescribers; on the contrary, the well-established symbols for this country will undoubtedly be retained by the majority of those who prescribe, whilst, at the same time, physicians or surgeons writing for patients whom they knew were Continental travellers might, in such cases, prescribe in grammes or grains, etc.

Amongst the preparations which have a good claim to admittance into the Pharmacopœia there are none more worthy than the concentrated infusions and decoctions, some of the latter being, indeed, so represented,—to wit, extractum sarsæ liquidum, extractum pareiræ liquidum; not that I would substitute concentrated preparations of any kind for the simple ones, when they could be prescribed without inconvenience; *vide* my article on "Concentrated Infusions," Vol. I. p. 7 of the 'Pharmaceutical Journal,' second series. But I think it is due to physicians and surgeons that they should, under certain circumstances, have the option and power of prescribing a concentrated infusion of uniform strength, when in their opinion they deem it desirable, with just as much reason as they do liquor cinchonæ, liquor belæ, and others, and with more claim to utility than succus conii or succus scoparii. But there is one point to which attention may be fairly drawn in all these preparations—are they not generally too highly concentrated, are they not constantly throwing down deposits from their solutions?

With respect to the combinations of glycerine, my experience leads me to think that in most cases it may be left to the prescriber; it is convenient for dispensers, where there is a steady demand, to keep tannic and gallic acids, quinine, and some others, in solution in glycerine; but where it might be useful to employ it as a menstruum for the vegetable extracts in place of oil, the solution is quickly made; the combination of it with starch can be speedily done with the assistance of a spirit-lamp, and as stated by others, it enters by no means well into the composition of ordinary ointments; any of the usual external applications of glycerine in combination with calamine, bismuth, etc., can be prepared as readily as any other prescription, therefore it appears needless to keep any such ready. I should like to see the old spirits of the London Pharmacopœia restored, and the spirits of the P. B. christened essences. Lozenges containing morphia and opium are at the best open to serious objection; if left about by accident or design, children would be very likely to eat them freely, and serious consequences might result. A word or two upon the palatability of medicines: something might undoubtedly be accomplished, but surely it rests as much or more with the prescriber than the pharmaceutist; a freer employment of the Pharmacopœia syrups, and the dilution of strongly flavoured medicines, would render them less nauseous; if prescribers would let aqua destillata figure a little more freely in their prescriptions the medicines would be more sightly, have fewer deposits, and be improved in flavour. The bitter of quinine and bark can be rendered more agreeable by the addition of a light white wine; powders generally may be administered in thick syrup of gum flavoured with orange-flower or lemon, with much less nausea than in the perpetual honey or jelly; pills and electuaries may be readily swallowed without taste folded in slightly moistened wafer-paper; and nearly all the preparations of senna are now more or less improved.

In producing the preparations contained in a Pharmacopœia, without advocating anything which might interfere with the quality, it would be desirable to see consistent economy and directions; for instance, speaking of economy, in the new liniments of belladonna and aconite, I would not sanction the waste of spirit left in the marc, I would either press it out or displace it, and the product would probably be found equal to that first percolated.

I would just add a hint about directions. I would avoid such as that given for tinct. guaiaci ammon., where, after maceration and filtration with the quantity of sp. ammon. aromat. sufficient sp. a. a. is to be added to make up the original quantity of fluid, experience telling me, at the same time, that there is no loss of bulk; on the contrary, in making four pints of the tincture the bulk is increased to the extent of five or six ounces. Again, in preparing the wines, if wine of colchicum and wine of opium are to be made up to a certain fluid quantity, why not also ipecacuanha wine?

Many similar oversights might be touched upon, but these will be sufficient to draw the attention of the Editors to those minor points which are nevertheless important in a standard work which treats of the means of health, and in the next edition will, I doubt not, have the attention merited. As a stimulus to others, I will finish with a line from an old acquaintance:—

> "Now, brother, if a better system's thine,
> Impart it freely, or make use of mine."

ON THE NOMENCLATURE OF THE PHARMACOPŒIA.

BY MR. HENRY DEANE.

On reading Professor Redwood's essay "On the Construction of a Pharmacopœia," while agreeing with him in almost every line of his valuable observations, I was particularly struck with the appropriateness of his remarks on nomenclature. When a youth, and learning the elements of my business, the prefixes *sub*, *pro*, and *per*, were common terms of chemical expression in constant use, and employed in the Pharmacopœia of 1824, and that valuable textbook, Thomson's Dispensatory. They were perfectly well understood, definite enough, and expressive. But in the succeeding Pharmacopœias, when other terms attempting to give expression to the chemical constitution of substances employed were introduced, it was foreseen by every one interested in it, that much inconvenience and danger would arise from the change, without a corresponding amount of advantage. Time has fully confirmed this view of the case, as every one who has been concerned in the dispensing of medicines during the past thirty years will have experienced. From the time that the old terms above referred to were dropped for others, which, in the evident rapid progress of chemical knowledge, could not be permanent, I have had but one constant feeling of regret, that what might very properly be considered terms of *fact* and of universal application should be dropped for those of theory, and which might possibly have a different signification in other parts of the world.

One very great difficulty arising out of these radical changes is that when medical men have grown up in the use of any terms whatever, learned under some particular system, it is not a very easy thing for them to get new ones constructed on more modern notions into their heads, seeing that in all probability the chemical knowledge they possessed on passing their examinations, has gone clean from them, except what little is required to steer them clear of serious errors in practice. Attempts at adopting a new method become more or less a failure, and lead to very serious difficulties, as I have frequently experienced. Young practitioners may get on very well, having no old ideas to get rid of. The same kind of difficulties exist to a much greater extent with those who have the responsibility of dispensing physicians' prescriptions. Old men cannot keep pace with the progress of chemical knowledge, and young men cannot easily pick up that which is antiquated, and perhaps written in a very indistinct and contracted manner or form. It is clearly in the interest of all concerned in the writing or dispensing of prescriptions, that such a nomenclature should be adopted as, if possible, to serve through all time, not only in this country, but wherever a Pharmacopœia is found needful. I therefore fully concur in Professor Redwood's suggestions, which are the more valuable as coming from one who, as a practical dispenser, is old enough to remember all the convenience and simplicity of the old terms, as well as the difficulties attending the new.

PHARMACY AT THE DUBLIN EXHIBITION.

(*Continued from p.* 52.)

There still remain for me to notice some objects in the British Department of the Exhibition, which, although not strictly pharmaceutical, appear to possess a certain interest for the scientific pharmaceutist.

The excellent series of products illustrative of the manufacture of *Paraffine*, shown in the case of Mr. Young, of the Bathgate Chemical Works, is of peculiar interest. Starting with examples of the different varieties of shale and cannel coal, among which the *Boghead Cannel* itself, the mineral which has been the cause of so much vexatious litigation, is of course prominent, we have the whole range of products which are obtained by its destructive distillation at a low temperature,—*Naphtha* (not a little used during the late high price of turpentine as a substitute for that liquid), *Burning Oil*, the familiar "paraffine oil," *Lubricating Oil*, and lastly, *Solid Paraffine*. It is much to be regretted, that a substance, which, at first sight, would appear to be admirably suited for many pharmaceutical purposes, which, if it would only permit of being introduced into ointments, for example, would possess the great advantage of not suffering oxidation, should still remain without any application in pharmacy. Paraffine is, however, a most intractable material. It will not form good mixtures with the solid fats, and persistently crystallizes from its solution in liquid oils. Some years ago a French perfumer published a pamphlet, in which a very little information was diluted with much ingenious advertising, and which gave what professed to be a formula for "hygienic cold-cream." This was to be made with paraffine and almond oil, but I need scarcely say that the combination of these into a smooth uniform ointment is impracticable. Still, paraffine is not quite useless in shop and laboratory; as it is unacted upon by either strong acids or concentrated solutions of caustic alkalies, it may be usefully employed for smearing the stoppers of bottles containing either, and so preventing their becoming too tightly fixed. Even solid caustic potash, chromic acid, or permanganate of potash, may be, with safety, enclosed in paper which has been prepared with paraffine, in the same manner as in making waxed-paper.

The *Alkali* manufacture is illustrated by but a single British exhibitor. Messrs. John Hutchinson and Co. (36), *Widnes, Lancashire*, have however a very good series of specimens. These include *Soda Ash*, crude and refined, *Salt Cake*, *Caustic Soda* of 60 and 70 per cent. real alkali, and *Bicarbonate of Soda*; *Sulphur* from "alkali waste" (which is, I suppose, sulphide of sodium) is also shown. The most interesting part of the collection is, however, two beautiful crystalline groups, one of *Carbonate*, the other of *Bicarbonate of Soda*. These are as nearly as possible alike in general contour, and are precisely identical as regards the form of the crystals. The bicarbonate has of course been made by exposing a mass of crystalline monocarbonate to the action of an atmosphere of carbonic acid, and the crystals are therefore *pseudomorphs*. Unfortunately the carbonate crystals, though as well protected from the air as is possible in a glass case, are rapidly efflorescing, so that the specimens will soon lose much of their interest.

There are several exhibitors of *Fats* and the *Fatty Acids* used in the manufacture of soap and candles. I have already noticed those in the case of Price's Patent Candle Company as possessing many points of interest to the pharmaceutist, and, with one exception, I do not know that there is anything else which —beautiful as are many of the products shown—calls for description in these pages. The exception is an article called *Wax Soap*, said to be made from wax, and understood to be manufactured from the product well known in commerce as "Japan wax." There is, however, no evidence that the soap, which is of particularly nice appearance, owes to wax anything more than its name. The fat-acid obtained by decomposing it has all the characters of that from cocoa-nut oil, which is well known not to be one of the best materials for the production of a really good soap. Japan wax is—like paraffine—a substance, of which the applications are very limited; it has the curious property of communicating to any fatty solid, with which it may be mixed, a very marked tendency to become split or fissured in cooling. The great bulk of that which is imported into this country, is, I believe, employed in the manufacture of "night-lights." While on the subject of wax, I must not omit to notice the very good specimens of both *Bleached* and *Unbleached Wax*, shown in the case of Mr. J. G. Rathborne of Dublin (61). In connection with wax bleaching, there are one or two facts, which, if well known, are certainly not generally mentioned in treatises on technology. One is, that the wax produced in the British Islands bleaches much more readily than African or West Indian wax, which are avoided by bleachers; another, that it is apparently not possible to remove the last traces of colour from this substance, no matter how long the action of light may be continued. All the *pure white* wax sold contains a very large proportion of spermaceti; much of it consists of little else. It is remarkable that no chemical process of bleaching this substance has ever really succeeded; all which have been tried exercising a deteriorating influence on the wax.

Messrs. W. J. Kane and Son, Dublin (23), who are well known as large manufacturers of *Sulphuric Acid* and *Chloride of Lime*, show both these products. The sulphuric acid is exhibited of two different densities—the "brown acid," sp. g. 1·750, used wholly by manure manufacturers, and the colourless concentrated acid, sp. g. 1·850. Nearly all the sulphuric acid made in Ireland is produced from the iron pyrites of Wicklow, containing a large proportion of sulphide of arsenic, which of course passes, as arsenic acid, into the acid itself. The acid is, however, prepared from Sicilian sulphur for pharmaceutical purposes, the manufacture of aerated waters, etc., by one maker in Dublin.

The Messrs. Kane also exhibit commercial *Hydrochloric Acid* and *Salt Cake* (sulphate of soda), the latter containing 99 per cent. of real sulphate. These specimens, which are all very good, are put up in a slovenly manner, which is not calculated to produce a favourable impression upon the visitor who does not know the reputation of the exhibitors, or the uniform excellence of their manufactures.

Mr. J. Mackay, Edinburgh, has a number of *Culinary Essences*, used for flavouring in cookery. These are very nicely put up, but do not present any point of novelty.

Perfumery has several representatives in the Exhibition, but the more practical *shop* view of the manufacture has in most cases been preferred to any attempt at the scientific illustration of the art. If there is any exception to this rule, it is in the case of Mr. S. Piesse (29), who has certainly done a great deal in many ways to popularize a knowledge of the principles upon which the extraction of flower-scents depends, and has also given not a little information to those who best know how to apply it. Mr. Piesse does not, however, show any novelties; what he does exhibit is for the most part a number of large bottles containing the principal simple odours which are used by the perfumer, as *Jasmin, Cassie, Rose, Violet, Musk, Vanilla*, etc. One of these is extract of *Civet*, a perfume which is not, I think, much used in actual practice. In this case are also *Sachet Powders*, and examples of some compound perfumes. It has often struck me as a question worthy of being settled by actual experiment, whether (seeing that by distillation all odours are more or less modified—that, for example, the perfume of otto of rose bears but a distant resemblance to that of the flower, and the scent of the finest neroli is as unlike that of orange-flower pomade as is bitter almond oil to nitro-benzol) some of the perfumes for the extraction of which we at present depend alone upon distillation, might not be more advantageously prepared by the process of *enfleurage*. It is not at all improbable that there would be as much difference between "lavender water," "spirit of peppermint," or *Aqua Sambuci* thus obtained, and the products which we are accustomed to, and consequently a nearer approach to the actual odour of the flowers, as in any of the instances I have adduced.

We should have to learn one thing, however, before we could do this. Thanks to Mr. Piesse and others, we know most of the details of the *enfleurage* process —at least, enough, perhaps, to carry it out successfully in this country; but we do not know how to prepare *scentless fats*. Until this can be done, any attempt of the kind would be futile. Any one who can tell us how the flower-farmers and perfumers of Nice and Grasse prepare the *odourless grease* which is used for the finest pommades will be conferring a positive benefit on pharmacy, for the non-permanence of ointments is certainly one of the many things for which we have yet to find remedies.

Mr. E. Rimmel (38) has, it is scarcely necessary to say, a handsome case. He shows *Perfumes, Toilet Soaps, Perfumed Bouquets* of artificial flowers, and *Perfume Vaporizers*.

The other exhibitors of perfumery in the British Department are Bewley and Draper (12), Bewley and Hamilton (40), and F. Lewis (24).

Among non-pharmaceutical products of direct chemical interest, the beautiful *Coloured Starches* shown by Messrs. J. and J. Coleman (39) deserve notice. They are simply ordinary starch delicately tinted with the aniline dyes; but the effect produced by their tasteful arrangement in the thin glass vases in which they are shown is very beautiful. They are intended for application to light fabrics, as muslin, etc., and fulfil the double duty of stiffening and of communicating a pleasing tint to the surfaces to which they are applied. I call attention to them here for two different reasons: one is that they are examples of the most recent adaptation of these exquisite colours; and the other, that they have suggested to me a possible application of starch to the preparation of *medicinal extracts of definite strength*. A liquid extract can always be made to contain, in a given volume, the same amount of the soluble principles of the vegetable substance which it represents, and is, as a rule, more to be depended upon than one which has perhaps been more or less altered by the heat required to give it a solid consistence. The consistence of a solid extract is moreover quite arbitrary, and is not capable of being expressed by reference to any fixed standard. But if a fluid extract of known strength were dried upon a given weight of starch at a low temperature, a dry powder at once, of definite medicinal value and convenient for manipulation, would be obtained. If such a plan as is here suggested should be available at all, it would, of course, be most successful in the very cases in which it would be most valuable—that is, with extracts which are usually prescribed in small doses. It will, of course, be remembered that we have in the pepsine powder of commerce an example of the same principle.

Mr. J. W. Hart, London (53), deserves much credit for the very instructive series of specimens illustrative of the manufacture of *isinglass* which he exhibits. The officials to whom the arrangement of the contents of the Exhibition were entrusted seem to have been guided rather by the aspect of the glass cases containing the products than by the excellence or importance of the specimens themselves. Mr. Hart has therefore to seek in the circumstance that he has covered his isinglass with a very unpretending case, an explanation of the fact that he has been allotted one of the very worst places in the whole building. When, however, the case has been discovered, its contents well repay inspection. They consist of a series of specimens of the different varieties of isinglass which find their way into commerce; thus, we have of leaf isinglass the *Hudson's Bay*, the *Samovey* and the *Astracan*, and of other forms the *Brazil Lump*, *Siberian Purse*, and *Samovey Book*. So far for the manufactured article. Then follow illustrations of the manufacture, which, by the way, include some very good and clear photographs of the machinery employed in this industry. The same weight—four ounces—of Russian isinglass is shown first as a sheet eight inches square by one-eighth of an inch thick, and then cut into the familiar "shreds," of which we learn that this quarter of a pound contains no less a number than 50,000, and which would, if laid in a continuous line, measure 12,700 yards. Several qualities of cut Russian isinglass are exhibited, from brown to nearly quite white, but it is not stated whether the difference is produced by the action of any bleaching agent.

There is a very ingenious contrivance shown in class D (80) by Mr. S. Bourne which is worthy of notice, as I can easily imagine many cases in which a modification of it might be turned to account by the pharmaceutist. The invention has for its object the preservation of liquids which are liable to be injured by exposure to the air, and is especially intended to be applied to casks used for containing beer, or wines which, like claret, are of low alcoholic strength. As applied to a cask, it consists of, in the words of the patentee, "a thin membrane, which divides the interior into two separate chambers, the lower of which contains the liquid, while the upper is filled with air that enters as the fluid is drawn off. It is so constructed as to adapt itself to the shape of one half of the vessel, to the centre of the sides of which its edges are attached, so as to form an air- and water-tight junction, and to have free motion either upwards or downwards." I do not know whether this is of itself an intelligible description, but when illustrated by the models in the Exhibition it is perfectly lucid. The arrangement, as shown, is simply this:—A cask, placed in the position which it usually occupies when in use, is divided into two equal portions by a thin sheet of *caoutchouc*, which is inserted between the staves. When the cask is full, the india-rubber of course is in contact with its superior parietes; as the liquid contents are drawn off it floats upon the surface, and without doubt excludes air. I need not here enter into the question of the practicability of employing an arrangement of this nature on the large scale, but I think, as I said before, that it is suggestive. Mr. Bourne himself says that it affords to chemists and druggists "the means of keeping ready for immediate use many infusions, solutions, and other preparations which involve delay in making on each separate occasion."

In Section X. (A, No. 300) Messrs. Spencer and Son, Dublin, show, together with other philosophical instruments of excellent workmanship, the new

Saccharometer, invented by the Rev. John H. Jellett, M.A., F.T.C.D. Apart from the fact that this instrument is a very great improvement upon that of Soleil, and is capable of solving problems with which the latter apparatus has not sufficient delicacy to cope, a short description of it will be rendered more interesting when I say that it is likely to become to the analytical chemist an ally of at least as great value as the spectroscope.

In the Proceedings of the Royal Irish Academy, vol. vii. p. 348, Professor Jellett described a new form of *analysing prism*, which it afterwards occurred to him could be applied to the construction of a saccharometer. The instrument of Soleil is, according to Professor Jellett, incapable of great accuracy; the error to which even an accurate observer is liable in using it being not less, in the case of a saccharine solution, than half a grain per cubic inch.

The new apparatus consists of, firstly, a means of obtaining a parallel beam of light; next, a Nicol's prism, by which this beam is polarized. The polarized beam passes through a tube containing a fluid, having a rotative power opposite to that of the fluid under examination. This latter fluid is contained in a narrow tube, the ends of which are closed by plates of parallel glass, and this tube has a motion along a graduated bar, and can be made to enter the larger tube containing the turpentine or other compensating fluid to any required depth. As the zero of the scale is made to coincide with the point at which the narrow tube dips in the compensatory fluid to the furthest extent possible, it is plain that the reading of the scale will indicate exactly the length of the column of fluid interposed. The analysing prism and an observing lens complete the instrument.

Now, bearing in mind that the principle of this saccharometer is the comparison of the degree of rotation of a fluid whose rotative power is unknown with that of one in which it is known, we will suppose that we are about to ascertain the strength of a given solution of cane-sugar. In this case French oil of turpentine will be the compensating fluid, and the vessel before described is filled with it. The tube is then filled with a sugar solution of *known strength*, and the zero of the vernier made to coincide with the zero of the scale. The tube is now moved back by means of its attached milled head until the tints on the two halves of the circular spectrum, which is seen on looking through the analysing prism, become equal in intensity. The reading of the scale is then noted. Let this be called R, and let S be the strength of the known sugar solution.

The sugar solution of known strength is now removed from the tube, and replaced by that of which the strength is required. The same process having been repeated, the scale is read, and the new reading called R′. Then the quantity of sugar contained in the unknown solution is obtained by the equation:—

$$S' = \frac{R'}{R} . S.$$

If the operation have been carefully conducted, the error should not, according to Professor Jellett, exceed 0·02 grain per cubic inch for a single experiment. Of course this error would be even still less, if the mean of a number of experiments be taken.

Professor Jellett has called the instrument a *saccharometer* because it would be best recognized under this name, but he more accurately defines it to be "an instrument by which the ratio of the rotatory power of any transparent fluid to that of a standard fluid may be determined."

Professor Jellett is at present engaged in a series of researches on the alkaloids, which I have reason to believe will be, when published, of the highest value, as by his method many questions can be solved which chemistry is incompetent to answer. My readers know already that the identity of the *aconella* of Messrs. Smith, of Edinburgh, with *narcotine* has been conclusively established by Professor Jellett. The adulteration of glycerine with sugar, the substitution of carbolic acid for wood creasote, the admixture of the lighter petroleum oils with turpentine or of French with American turpentine, each and all of which can be readily detected in this way, are only a few examples of the aid which chemical analysis is likely to derive from this valuable instrument. As the description which I have given of it is, I am afraid, not likely to be very intelligible without the aid of a diagram, I may refer those who are interested in the matter to the original paper, which was read before the Royal Irish Academy, on January 26th, 1863, and which, besides forming a part of its published proceedings, has been reprinted in a separate form.

I hope in my next communication to describe the objects of pharmaceutic interest in the Colonial and Foreign sections of the Exhibition.

HARRY NAPIER DRAPER.

PHARMACY AT THE DUBLIN EXHIBITION.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In last number, we get credit for the handsome Codeia Bowl exhibited by Messrs. Macfarlane and Co. in the Exhibition of 1862. We exhibited there, side by side with Messrs. Macfarlane and Co.'s case, a case of opium products; and some notoriety was given to a remarkable crystallized Thebaia Bowl (requiring £11,000 worth of opium to produce it) which we exhibited at a very remarkable conversazione of the Royal Society here, and which bowl is now the property of the University of Edinburgh. These two circumstances blending in the mind of the writer on "Pharmacy in the Dublin Exhibition," no doubt caused the innocent mistake, which we beg to set right.

Yours, etc.,

Edinburgh, 18th August, 1865. T. AND H. SMITH.

THE ASHBURTON POISONING CASE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The Ashburton case of attempted poisoning appears to have created considerable correspondence, in the London 'Times,' the local papers, and in a great number of private letters to myself; many of the former seem to have been written more with the view of bringing the writers' names before the public, than with that of tracing the crime.

That a rabbit, weighing at most 2 lb., should eat with impunity so much belladonna, and absorb so much of it into its system as very nearly to kill four full-grown individuals, seems too ridiculous to be entertained; yet it has been put forth as the probable cause of the effects. Another writer has said that atropia is very easily detected, because it expands the pupil, forgetting, or being ignorant of the fact, that there are other alkaloids which operate in the same way, and that it is extremely difficult to eliminate most of the alkaloids from butter, fat, common salt, coagulated albumen, and osmazome, all of which would be found in a meat pie; before applying reagents I proceeded thus:—I introduced the rabbit's leg *whole* into diluted hydrochloric acid cold, the albumen and fat were left upon the filter through which I passed the solution, which was then evaporated to dryness; benzole dissolved from this any remaining fat or butter. I acted on the residue with alcohol, which dissolved the alkaloid with a trace of common salt and some osmazome, neither of which would interfere with the tests I intended to use, the alcoholic solution was evaporated to dryness and redissolved in water, and tested with the iodochloride of mercury and potassium, which showed that I had obtained an alkaloid, and a little of the solution weakened and applied to one of my eyes, in ten minutes expanded the iris to double its previous diameter; it was thus brought into the limited class of three (as given in chemical works), atropia, daturia, and aconitia; but I had by reagents and the microscope previously proved that the two first are really but one alkaloid, though obtained from different plants, yet I made hydrochlorates of atropia, daturia, and aconita from alkaloids in my possession, and upon testing with chloride of gold and with picric acid they all gave yellow precipitates, but with chloride of platinum the salt of aconita *did not* precipitate it, consequently it could not be the latter, and must be atropia; but in addition, I found that the microscope with an object-glass of $\frac{1}{4}$ in. focus resolved the various yellow precipitates into definite crystalline forms capable of enabling us to discriminate between the two poisons.

We have now, therefore, the power to discover four of the alkaloids in complex solutions—strychnia, morphia, atropia, and aconitia; and daturia should be expunged from the list.

Your obedient servant,

WILLIAM HERAPATH, SEN., F.C.S., ETC.,

Professor of Chemistry, Bristol, Old Park.

THE FATE OF BILLS Nos. 1 AND 2:—THE MORAL.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The Parliamentary campaign of 1865 has resulted in failure, so far as Pharmaceutical legislation is concerned. Before turning over a new page, it is but prudent to see what lessons can be learned from the late attempt. The question that first suggests itself is, "Why did we fail?"

As far as I am able to trace cause and effect, defeat arose from two causes, viz. the opposition of the United Society, as shown in introducing and supporting an antagonistic and irreconcilable Bill; and secondly, from Bill No. 1 losing the sympathies of the Select Committee, because it did not embrace any restrictions upon the sale of poisons. The desirability of such restrictions had been strongly urged by the medical witnesses who had given evidence, and it was clear that the framers of Bill No. 1 did not omit such a clause from any affection for absolute free-trade. Those who were urging a monopoly of dispensing upon the ground of the public interest, might have been expected to have been equally solicitous to promote similar security in the much wider question of the sale of poisons. The evil to be remedied was more glaring, and it was not an unnatural conclusion for a non-professional commission to arrive at, that a Pharmacy Bill which placed no restrictions upon the sale of any poison would be worth very little. The opinions of the press have been freely given, and have shown a similar wish for some reasonable restrictions. The extreme tenacity in favour of a system of *laissez faire*, which certainly prevailed a few years since, is evidently much modified at the present time.

But I may be told that the promoters of Bill No. 1 deferentially offered to introduce a poison clause if the Select Committee wished it. Those who concur with what has just been said of the popular feeling upon this subject will, I fear, be inclined to smile at the elasticity of such an offer. At any rate, it is satisfactory to find that we are all agreed upon the point, so that as soon as a poisons clause can be shown to be popular, the leaders of opinion amongst us will join to swell its triumph!

And now as regards the opposition of the United Society. It could hardly have been predicted that it would take the shape that it ultimately assumed. It was hardly probable that what I may advisedly call an *impossible* measure would have been started, in order to throw Bill No. 1 off the rails by a collision. We might have expected that the United Society would have shown the formidable front which it can exhibit when it thinks itself attacked, would have made claims somewhat greater than it was disposed finally to exact, and that a compromise would have been happily effected. There was unfortunately in Bill No. 1 but too much room for such claims. It may have represented the views of its framers, but showed scant consideration for the possible opinions of those beyond the pale. A railway Bill having a formidable rival would have been charged with conciliation, if a parliamentary battle could have been thereby avoided.

That negotiation between the two Societies is not out of the question has been shown by its having occurred after the opening of the sittings of the Select Committee. Probably half the concession, if made three months earlier, would have effected what was then too late. It is only right to bear in mind that the opinions now expressed have been advanced repeatedly by members of the Pharmaceutical Society during the past twelve months, and that they have been, and doubtless still are, the opinions of a minority of the Council. The difference between the minority and the majority has now been submitted to the crucial test of experiment, with what result we all know. I believe that Bill No. 1 was sound in its main feature, of registering every existing member of the drug trade, and in making two grades. The differences of locality demand such an arrangement, and the two classes would regulate themselves according to their local requirements. Without two classes, we should have to lower irrecoverably the status of the present Pharmaceutical Chemist, and in a few years should have to create afresh a new grade to supply his place. The members of the Pharmaceutical Society have a responsibility which they can hardly delegate entirely to their Council. With regard to the details of any measure, unquestionably the Council possesses means of information superior to those at the command of private individuals, but as far as the broad principles of such legislation are concerned, the members generally, and especially those living in the great centres of activity, owe to the body politic the duty of stating their opinions. A generous support to the Council may be given without accepting all its conclusions as infallible. We need not quarrel because differing in opinion.

In a circular issued June 29, 1865, and signed by the President of the Pharmaceutical Society, the members are urged to bring their influence to bear upon candidates for Parliamentary seats. Mr. Sandford says,—"The absurdity of elevating the responsibility of vending dangerous drugs beyond that of compounding them, as well as the great difficulty of fettering mere sales, and the comparative ease of regulating dispensing, should be strongly pointed out." Now, I am not aware that the Pharmaceutical Society has adopted opposition to a poison clause as a canon of belief, and certainly if the temporary reception of such a sentiment has materially conduced to our defeat in 1865 we shall be but prudent to avoid it in 1866.*

* The 'Saturday Review,' of August 5, offers the following opinion:—"The evidence taken by the Select Committee of the House of Commons on the Chemists and Druggists Bill fully bears out the conclusions which that Committee has derived from it. There were two principal evils which these Bills were designed to remedy:—1. It is said that the dispensing of medicines ought to be confined to a class of men whose knowledge of the nature and properties of drugs has been tested by examination. 2. Some restriction is demanded upon the existing free trade

I quote again from the circular.

"I am sure you will agree with me, that to institute a lower grade of examined men—men only declared qualified to sell—would act most prejudicially, misleading the public, and creating jealousies amongst ourselves."

This sentiment is not quite intelligible, since Bill No. 1 provided for "a lower grade of examined men," though not granting them union with the Society. However, this point was conceded in the negotiations with the United Society.

In conclusion, may no one infer that because there are difficulties in the way we had better "rest and be thankful"! Mr. Orridge has shown us too plainly the danger of doing this. Our difficulties would not have had half their present gravity if met ten years ago, and they will grow every year by delay. If we regard the campaign just past as a *reconnaissance*, and learn the lesson it teaches, it will not have been wasted.

If the United Society has proved a formidable opponent, it can wield the same power in the character of our ally. Another session we have only to go to Parliament with a common cause, and success is certain. For this end may we meet with a liberal spirit the large number of chemists who, although not within our ranks, are equally desirous with ourselves of advancing the cause of Pharmacy! *Non licet in bello bis peccare.*

I am, yours, etc.,
R. REYNOLDS.

Leeds, August, 1865.

BETTS'S METALLIC CAPSULES.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The chemists of this town, with only one exception, have signed the annexed document, as also some wine-merchants and pickle-sellers, and if it were made public and all towns were to adopt the course, it would soon put a stop to Mr. Betts's attempt at extortion. Immediately upon receipt of the last Journal, I took upon myself to get a document drawn up by a lawyer, and have called upon most persons trading in metallic capsuled articles, cautioning them against trading in such things. Any use you like to make of this letter you are at liberty to do.

I remain Sir, your obedient servant,
BENJAMIN LINDO.

1, *King Street, Dover, August 7th*, 1865.

"METALLIC CAPSULED GOODS.

"We, the undersigned tradesmen of Dover, do hereby declare, that in consequence of twenty-three Bills in Chancery having been lately filed against various retail chemists and perfumers, by Mr. William Betts, the patent metallic capsule manufacturer, for selling articles capped with capsules alleged not to be of his manufacture, we have determined, and do hereby mutually undertake, that we will not order nor sell any metallic capsuled articles whatever, and that we will immediately destroy all metallic capsules, whether of Mr. Betts's patent or not, that we find in our stock."

Here follow the signatures.

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in poisons, so that the sacrifice of life, which now occurs through ignorance or carelessness, may be diminished. The second of these precautions is perhaps of more distinctly obvious necessity than the first. The dispenser of medicine assists the physician, and those who desire to profit by the skill of the latter will feel interested in the efficiency of the former; but persons who consider that doctors are of no use will not be likely to trouble themselves about educating druggists. The opinions expressed by Dr. Quain and other witnesses as to the public importance of this education received from the Committee rather less attention than they deserved.

DEFENCE FUND.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—May I request the favour of your inserting the following note and remarks in reference to the fund now forming for the protection of the innocent defendants in the recent suits in Chancery?—

"Gentlemen,—By the request of the committee, I beg to enclose you a list of subscribers to the Defence Fund for your favourable consideration.

"Oblige me by returning it at your earliest convenience.

"I remain, yours obediently, W. TWINBERROW.

"2, *Edwards Street, Portman Square, W., August* 16, 1865."

The above, with the list of subscribers, has been forwarded to several of our brethren, and liberally responded to, but one or two of our wholesale friends tell us that the defendants ought to have submitted to the Chancery suits, and then have proceeded against Mr. Rimmel for costs. I am desirous of stating that the form of suit is such as to leave the defendants no remedy, or at the utmost but a very doubtful remedy against Mr. Rimmel, so that to settle and leave damages was impracticable. Now, I think, if they will consider for one moment the enormous expense that would be incurred by more than 500 separate double suits, in some instances against those who really cannot afford it, they will come to the conclusion that the course pursued has been the right one, and had it not been through the decision of an influential meeting held on July 22nd, when it was agreed that the then several actions should be resisted, perhaps 500 or more retailers could by this time have been in the same predicament as the present defendants; but I can congratulate the retail trade that all our wholesale friends were not of the same way of thinking, but have most handsomely contributed to the fund, which at some future time, I hope, will be made known to the trade generally. I remain, your obedient servant,

W. TWINBERROW, *Treasurer.*

LETTER FROM MR. RIMMEL.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In the article contained in your last number, respecting Mr. Betts's numerous prosecutions against retail venders of articles covered with metallic capsules, you say that I stated at the meeting of the Pharmaceutical Society that the French capsules used by me *had been* made by Betts's process since the expiration of his French patent. This is a slight error, and you will perhaps allow me to rectify it, as it might otherwise prejudice the case now pending between Mr. Betts and myself. I merely said that they *might have been* made by his process, but that I had no means of knowing it, the appearance of tin or tinned capsules being perfectly similar, and there being other ways of tinning capsules than by Mr. Betts's process.

As regards the proposed compromise of £1000, it is true that I offered that sum to Mr. Betts to withdraw all actions, not only against myself but against any of my customers for selling my goods, for although I was not *legally* responsible for them, I felt very anxious to protect them from any annoyance. It was perfectly understood with Mr. Betts's representatives that this sum would cover all bills then issued (which I had been told numbered about a hundred) and prevent him from issuing any more on the same grounds. When, however, the deed was sent me for perusal, it did not contain these important provisions. I sent it back with the necessary alterations, but Mr. Betts refused to sign it, and so the matter ended. I then adopted the only course left open to me, which was to caution all my customers, and recommend them to destroy *all* capsules on any of my articles they had in stock, offering to replace them with a new guarantee label I have adopted to supersede the capsule, and put an end to such vexatious litigation.

I remain, Sir, yours respectfully,

E. Rimmel.

96, *Strand*, 5*th August*, 1865.

ON PEPSINE.

(*Extracted from the 'Formule Raisonnée des Médicaments Nouveaux,' etc., par O. Reveil.*)

Pepsine was introduced into medicine by Dr. Lucien Corvisart. The daily increasing importance of pepsine, which has now been in use during the last fourteen years, demands a short history—1. Of its extraction; 2. Its employ; 3. Its pharmaceutical preparations, including the principal formulæ in use.

1. This substance, which is the active principle of the gastric juice, is found in those glands of the stomach called peptic of vertebrate animals; but the isolation and preparation, so as to preserve to this agent its physiological properties, are extremely delicate operations.

A. Certain pharmaciens have lately found no means more profitable and economic than that of simply drying the mucous membrane of the stomach of animals (pigs, etc.), and selling it under the name of pepsine. Nothing is more simple, but nothing more deplorable in every respect; the name of this product is at once a falsification, as the pepsine is as impure as it is possible for it to be, none of the detritus of the dead membrane or of the putrid matter being removed. For example, if this powder is mixed with water and maintained for twenty-four hours at a temperature of 40° C., it is decomposed, and exhales an insupportable and fetid odour. This in Germany has been designated "Pepsine de Lamatch." These products are easily recognized under the microscope, which discloses the organic cellular *débris*.

B. Other manufacturers have at least eliminated those putrefiable portions of the gastric membrane which are solid. Heidenham directs the maceration of frogs' stomachs, and the liquid portion only is desiccated. Some, to disguise the putrid matter (after the example of Dr. Aschentreumer), have added to this product, before evaporation, 2 to 5 per cent. of salt. The preparation sold at Berlin under the name of "Pepsine de Simon" contains salt; this is easily recognized, as, when exposed to the air, it becomes viscid and attracts moisture rapidly, an inconvenience which causes the weight of the pepsine to vary with the closing of the bottles and the changes of the atmosphere.

These preparations are simply the liquid or solid rennet, in which, at the end of a few days, the digestive property is lost; that of Aschentreumer has been named Chymosum Muriaticum Dilutum. None of these can be called pepsine, and ought to be studiously interdicted, as they are merely falsifications.

We will now consider pepsine isolated from all foreign matters—that is to say, chemically pure. Schwann was the first (1834) who extracted (and named) pepsine from the gastric juice in a state of purity; to this end he made use of bichloride of mercury, which precipitates pepsine; the precipitate was dissolved in hydrochloric acid, through which he then passed a current of sulphuretted hydrogen, to throw down any excess of mercury, and leave the pepsine in solution. Wasman employed acetate of lead. These facts were little known in France when this substance was extracted from the rennet by Deschamps by means of ammonia, by Payen from the gastric juice by alcohol; other processes are given by George Wood and Franklin Bache, authors of the United States Dispensatory, etc. etc.

After extraction, pepsine, freshly prepared and dissolved in acidulated water, is precipitated from its solution by protosulphate of iron, acetate of lead, sulphate of copper, bichloride of mercury, tannin, alcohol, etc., it combines with certain acids, and it is in this state that it exists in the gastric juice, but we do not think it is able to form definite salts, so that the names of acetate and hydrochlorate of pepsine are wrongfully employed; without any trace of acid, and neutral to litmus, it is little or not at all soluble in water. Experience has shown the physiological action of pepsine, to which the gastric juice owes its digestive powers, as it produces the operations of digestion exactly identical.

2. *Its Employ.*—It should be a medicine acceptable to the taste, and the digestive power, naturally variable, should be brought by science to a uniform standard; and, finally, that a chemical determination should be made as to the doses in which it should be administered. It was in 1851 that the first chemical observations were made by Corvisart, and towards the end of 1852 this doctor communicated his opinions to the Academy of Sciences; some refused to admit the idea of assisting human digestion by the digestive agent of animals, or that this, once extracted, could retain the properties it possessed as gastric juice; but others, more advanced in modern science, saw in this a radical progress in an entire branch of therapeutics. In 1854, Corvisart determined the form, the mode of administration, the doses, and the cases which required the application of this new physiological medicine; the detailed observations of a great number of physicians depose to the correctness of the result stated. Thirty-two cases were reported, in a third the contra test recommended by Corvisart had been tried with the best success, viz. *with the cessation* of the pepsine at meals the *indigestion reappeared.* The same year, Rilliet (Geneva) stated the good effects of its use, and recommended that it should be tried in all cases of disordered stomach. In 1855, L. Fleury reported many successful cases. Desmartes (Bordeaux) advocated its employ in chlorosis and choleraic diarrhœa of infants. Dechambie also published the happy results from its use; and Debout, from his experience, particularly recommended it in the diarrhœa of young children. In 1856, Corvisart was rewarded by the Institut. In 1857, Ballard, physician to St. George's Hospital, having employed Boudault's pepsine, stated, "he thought that he ought to acquaint the profession with the results he had obtained, as they promised henceforth to largely diminish the mortality from many diseases;" at the same period, another English physician, Nelson, confirmed the good effects of liquid pepsine (liquor pepticus). Finally, T. K. Chambers, Dr. Todd, Dr. Protheroe Smith, James Ross, William Moore (Dublin), strengthened the facts already advanced. In 1858, L. Gros employed pepsine with success in the sickness incidental to pregnancy; Barthez has administered it to children suffering with apepsia, in which the food passes through the stomach and bowels undigested; after the exhibition of the pepsine, digestion took place, and the stools presented a natural appearance.

Pepsine is indicated in cases where the secretions of the stomach, being disordered, the digestion is laborious, imperfect, or almost impossible—that is to say, in gastralgia, dyspepsia, debility, convalescence from acute diseases, etc., when the food produces vomiting, nausea, diarrhœa, etc. etc. We may add, that the rapidity of its action in appropriate cases is so great that it forms an excellent means of diagnosis; employed at hazard in an affection of this sort, if it succeeds, in three or four days the cure commences; if it fails, this short space of time is sufficient to show that it is not in the gastric juice that the physician ought to search for the cause of the malady, an advantage which spares much loss of valuable time and useless treatment. This was especially remarked by Rilliet in his practice.

3. *Its Pharmaceutical Preparation.*—It is solely perfectly pure pepsine that is capable of being employed therapeutically. When pure, after being extracted and dried at 40°, it has the form of laminæ or scales of a lemon colour, very similar to dried albumen; taste slightly styptic, and generally a slight odour of cheese when rubbed. It is extremely delicate, and a temperature higher than 45° C. completely destroys its digestive property without altering its chemical composition. It is impossible to employ pepsine in a state of extract for many reasons.

First. It has been remarked that pepsine (a product of fermentation rather than a simple chemical body) varies extremely in energy according to the species of animal from which it is procured, and in the same animal whether taken at the time of eating or fasting, whether young or old, change of seasons, etc. etc., so that any two preparations do not resemble each other. Sometimes it is necessary to use 20 centigrammes to produce a given effect, another time 70; but it is important to the physician to be able to administer an equal digestive power in the same weight, it is necessary to add to the pepsine a variable quantity of inert matter, so that a given weight contains always an equal amount of digestive power.

Secondly. When the extract is desiccated without any additional substance it does not retain its original form; being hygrometric in the highest degree, it readily absorbs humidity from the atmosphere, becomes viscid, soon liquefies, and consequently returns into the category of nitrogenous bodies, which, in the presence of water and a slightly elevated temperature, enter into putrid decomposition. In this state pepsine loses all its digestive properties, and is variable from the augmentation of weight due to water, the medicinal properties diminishing accordingly.

How is the hygrometricity to be remedied? The inert powder already mentioned solves this problem, since, as soon as it is intimately incorporated with the extract, this ceases to attract humidity, and preserves a granular pulverulent form. Starch is the substance which best preserves pepsine from decomposition without injury to its therapeutic action; most other vegetable powders, either from the tannin they contain or from some catalytic force arising from their porosity, destroy rather than preserve it.

The admixture of starch gives to pepsine the most convenient form. Corvisart has noted all the conditions that it ought to present in practice, viz.:—

First. The action of the gastric juice is the dissemination of its active principle amongst the food, so the pepsine in powder imitates the natural action by the dissemination of its granules; on the contrary, the pills, etc., of pepsine have an opposite effect, and frequently pass into the intestines without action.

Secondly. The gastric secretion does not pass into the stomach by the mouth before action; so, the pepsine powder, taken in wafer paper, commences to act in the stomach, and thus fulfils the physiological design; whilst the *dragées* or pepsine lozenges, which dissolve in the mouth, are little in accordance with it.

Thirdly. The gastric juice is secreted drop by drop, slowly and successively; so each granule of starchy pepsine evolves, in dissolving, its active principle, thus imitating the formation of the natural fluid. This is not the case with the solutions of pepsine. When administered, in cases where the stomach is irritable, under the form of wines and syrups, it is sometimes borne with difficulty.

These conditions, which demand a preparation pure, unalterable, possessing always an invariable digestive power, are fulfilled by the "Pepsine Amylacée," or medicinal pepsine, which imitates the formation of the gastric juice, its gradual secretion, and its slow and continual dissemination amongst the food.

Mode of Extraction.—A certain number of calves' or sheep's rennets are taken from the animals as soon as killed, thoroughly washed with water; the mucous membrane, which contains the peptic glands, is scraped, macerated in water at 10° to 15° C. for twelve hours; the pepsine in the solution is then precipitated by acetate of lead, allowed to settle, and the supernatant liquid poured off; a current of sulphuretted hydrogen is passed through the semi-liquid deposit, which precipitates the lead in the form of sulphide; the pure pepsine remains in solution with the free acetic acid; it is then filtered, and finally evaporated to dryness at a uniform temperature of 40° C.

The next operation is the trial and determination of the dose of the pepsine. To determine the quantity of digestive power contained in a given weight, three samples are taken from the mass, the first of 25 centigrammes, the second 50 centigrammes, and the third 75 centigrammes. Each is placed in a separate vessel, with the addition of, first, 25 grammes of water; secondly, acid (lactic or other acid), a sufficient quantity to saturate 17 centigrammes of pure caustic potass (equivalent to the acidity of the gastric juice); thirdly, fibrine obtained from calves' blood, washed and strongly pressed in a cloth. The three vessels are then placed in a stove, and maintained at a uniform temperature of 45° C. for twelve hours. The sample in which the fibrine has been dissolved and converted into pure peptone (albuminose), not precipitable by nitric acid, is the normal and therapeutic dose of the pepsine.

But as the weight of pepsine necessary to obtain this regular power varies incessantly, sometimes 25, sometimes 50, or 75 centigrammes, whichever it may be, at each operation, sufficient starch is added to make the weight 1 gramme, so that each gramme contains invariably a uniform digestive power, the quantity of starch alone varying. No physical or chemical characteristics distinguish active pepsine from that which is inert, nor from other nitrogenous bodies more or less allied; the only important quality being its digestive power, the test with fibrine is the only method of determining their value, all preparations, whatever may be their aspect and chemical reactions, are not pepsine if they do not answer to it. The digestive characteristic consists in that pepsine, in twelve hours, dissolves fibrine, and converts it into peptone, not precipitable from its solution by heat, alkalies, or acids; sometimes the dilute acids (hydrochloric, etc.) dissolve fibrine, causing it at first to swell enormously, which is characteristic of their action. Besides this, after twelve hours peptone is not formed; as the liquid gives a large precipitate with nitric acid, this test is conclusive. The following table gives a *résumé* of the conditions, the progress, and the results of the test according to the case.

The entire dose of pepsine or other dose for examination being given, two samples are taken; with the first the amount of acidity is determined; to the second 25 grammes of water at the ordinary temperature are added, and sufficient acid to render it capable of saturating 17 centigrammes of caustic potass (the normal acidity of gastric juice); it is then agitated until the pepsine is dissolved. If the operator is accustomed to the manipulation, it is unnecessary to filter the solution; if otherwise, it is better to do so. When the liquid ceases to flow, any pepsine remaining in the starchy matter on the filter is displaced by passing 5 or 10 grammes of water through it until exactly 25 grammes are obtained; (if the preparation is liquid, 25 grammes are taken, and acidulated as directed;) 6 grammes of fresh fibrine, thoroughly washed and pressed into linen to remove the water, are then added to the filtrate, and the bottle, well closed, is kept at a temperature of 45°, with occasional agitation, during twelve hours.

For example, the comparative action of 25 grammes of water acidulated, but without pepsine, and 25 grammes of water equally acidulated, but with the normal dose of pepsine.

Water of the normal acidity of gastric juice.	*Solution of pepsine prepared according to the previous instructions.*
1. Immediate and enormous swelling of the fibrine. After three hours the water is almost or entirely absorbed. The bottle can be reversed without spilling the contents.	1. Little or no swelling of the fibrine, no absorption of water. After three hours the solution commences. The contents of the bottle are liquid.
2. After twelve hours the fibrine is still apparent, swollen, and transparent: no powdery residue at the bottom of the bottle.	2. After twelve hours, and frequently before, the fibrine has completely disappeared in the solution: a powdery residue* remains at the bottom of the vessel.
3. The *liquid* obtained at this hour filters *very* gradually.	3. At this hour the *whole* of the liquid filters very rapidly.
4. The *whole* liquid being filtered, nitric acid is added, by means of a tube, drop by drop. The first drop produces abundant precipitate, almost in a mass.	4. Four drops of nitric acid added to the filtered solution produce no precipitate.
Result: Fibrine not digested, absence of pepsine, or the pepsine is adulterated.	Result: Solution of the fibrine: transformation into peptone; digestion perfect, and the pepsine good.

With pepsine not absolutely pure there is a slight cloudiness produced by nitric acid, showing the presence of a product of digestion not perfectly transformed, and still in the state of dyspeptone (Meissner).

The solution remains perfectly transparent on the addition of four drops of nitric acid =pure pepsine.

The solution is slightly cloudy=good pepsine.

The solution is extremely opaline=adulterated pepsine.

The solution gives an abundant precipitate=absence of pepsine.

Formulæ.—The following are the most useful of the many forms in which pepsine is employed:—

1. Extract the pepsine as directed; neutralize with carbonate of soda; ascertain the physiological dose; to 100 such doses add starch sufficient to make 100 grammes: mix, powder, and divide into 100 packets. One packet for a dose.

2. To 100 doses of pure pepsine, add sufficient to saturate 7 centigrammes of potass: mix with starch as the preceding. This acid pepsine is sufficiently acidulated in the majority of pathological cases, as there exists generally an acid secretion in the stomach; if it is necessary to increase the acidity so as to render it equivalent to that of the gastric juice, 10 centigrammes of lactid or other acid are added to each dose. The

* Parapeptone digestible in the intestines.

pepsine is taken in dose of 1 gramme, enveloped in wafer-paper; if necessary, a second dose is taken at the end of the meal, or an hour after. In some special cases of *painful* digestion 1 centigramme of hydrochlorate of morphia, or codeia, is added to each dose of acidulated pepsine: the addition of 3 milligrammes of strychnine is useful in muscular atony of the stomach.

3. Elixir of garus, 30 grammes. Syrup of cherries, 40 gr. Distilled water, 80 gr. Starchy pepsine, 10 gr. Dissolve the pepsine in the water, filter, add the elixir and syrup. Dose, 1, 2, or 3 tablespoonfuls twice during the meals.

4. *Elixir de Pepsine* (Corvisart).—Elixir of garus, 150 grammes. Starchy pepsine, 10 gr. Triturate the pepsine with the elixir, macerate for half an hour in a covered vessel, and filter through paper previously moistened. Dose, one tablespoonful before or during meals.

5. *Compound Elixir of Pepsine.*—Elixir of garus, 150 grammes. Syrup of cherries, 300 gr. Starch pepsine, 30 gr. Mix as previously directed. Dose, one tablespoonful before or during meals.

6. *Elixir de Pepsine* (Mialhe).—Starchy pepsine, 6 grammes. Distilled water, 24 gr. White wine (Lunel), 54 gr. Sugar, 30 gr. Proof spirit, 12 gr. Macerate until the sugar is entirely dissolved; filter. This elixir has an agreeable taste, and is taken without reluctance. Dose, same as preceding.

7. *Pepsine Wine.*—Starchy pepsine, 10 grammes. Wine (Lunel), 200 gr. Macerate and filter.

8. *Syrup of Pepsine* (Corvisart).—Syrup of cherries, 150 grammes. Starchy pepsine, 10 gr. Heat the syrup to 20° or 25° Cent. Mix with the pepsine, leave in contact for half an hour, filter.

9. *Pepsine Pills* (Boudault, Hottot).—Starchy pepsine, 10 grammes. Powdered tragacanth, q. s. for 60 pills. Dose, three pills at the commencement and three after, and sometimes three during the meal.

10. *Pepsine Pills* (Hogg).—Starchy pepsine, 10 grammes. Nitrate of bismuth, 5 gr. Lactic acid, 2½ gr. Mix, and divide into 100 pills; coat with sugar and balsam of tolu. Dose, 4 to 12 pills one hour after meals.

11. *Pills of Pepsine and Iodide of Iron.*—Starchy pepsine, 10 grammes. Iodide of Iron, in crystals, 5 grammes. Syrup, q. s. Divide into 100 pills; coat with reduced iron, 10 grammes; finish with the sugar coating, as No. 10.

12. *Pepsine and Iron Pills* (Hogg). Starchy pepsine, 10 grammes. Gentian powder, 5 grammes. Syrup, q. s. Divide into 100 pills; coat with reduced iron, 25 grammes; finish with sugar, etc., as preceding.

13. *Copaiba and Pepsine Capsules* (Ricord et Faviot).—Balsam of copaiba, 270 grammes. Neutral pepsine, 60 grammes. Nitrate of bismuth, 12 grammes. Calcined magnesia, 18 grammes. Divide into 600 capsules. 15 to 18 daily.

It is a question at first with what design pepsine is combined with copaiba, if it is in order to render it more absorbable, as it is known that fats and resins are rendered easier of absorption by alkalies, by the bile and pancreatic secretion, not by pepsine; on the other hand, pepsine acts solely in the presence of acids; here it is combined with an alkaline earth, which cannot but injure its action. This formula of Ricord and Favrot seems to be imitated from that of Dr. Sigmund, who has seen that bichloride of mercury, copaiba, and cubebs were better supported when in combination with pepsine.

The modes of administration proposed for pepsine are very numerous, but, in Corvisart's opinion, the pepsine in powder, the syrups, the elixirs, and wine answer every exigency. The most preferable forms are those that are most miscible with the food. Finally, besides the addition of codeia, nitrate of bismuth, strychnine, lactate of iron, and reduced iron (in small doses), which are without any injurious action on pepsine, many formulæ have been proposed in which it is combined with a large number of other remedies; but these preparations are better avoided. So the combination of pepsine with alkalies or alkaline lactates is not physiological; the alkalies very certainly produce good results in some dyspepsias, but they have an action very distinct from that of pepsine. We think that the alkaline salts and the gastric secretion may be mutually injurious when meeting in the stomach, especially when the stomach does not sufficiently renew the peptic fluid, for it is necessary to remember that the acidity is the essential ingredient in it, and it is therefore necessary to employ pepsine and the alkaline lactates separately.

All other remedies are incompatible with pepsine, if administered at the same time; all such medicines should be given three hours after.

FRANK VINCER.

Pharmacie Dalpiaz, Paris, August 1st, 1865.

PROTECTED GUNPOWDER.

Mr. Gale's invention having survived the most severe and complex trials, which are the measles of the infancy of an invention, it is but fair that we should draw more particular attention to it than has been done by the scattered paragraphs which have from time to time appeared in our columns. From being a chimerical idea, calculated to astonish country gentlemen and provoke a smile of pity on the faces of respectable authorities, the non-explosive gunpowder, as it is familiarly called, has worked its way upward to be recognised as a definite practical fact. The paragraphs in quiet country papers which first announced its existence have been expanded to metropolitan leaders, and every true Briton knows the importance of a subject which has attained to a leading article. The experiments which were made on Saturday evening at Torwood, Wimbledon, differed in almost no particular from those by which the efficiency of Gale's protective powder have hitherto been tested; possibly because these experiments have been as subtle and searching as could well be devised. Slow matches were burned into vessels holding gunpowder mixed with the protective powder, and they only served to ignite a few isolated grains. Vesuvian matches were flung into the powder, and were ignominiously extinguished. A red-hot poker was stirred through the powder, with no better (or worse) effect. But by far the most convincing test is that which was proposed by Lord Bury—namely, that a quantity of pure gunpowder should be placed in the centre of the protected gunpowder and the former fired. This experiment was also exhibited on Saturday; and if we remember the keen, permeating power of flame, especially where that flame has been propelled in every direction by a vigorous explosion, we can understand how gunpowder that may resist this attempt at ignition may, with some show of reason, be pronounced safe. The pure gunpowder was placed in a sort of pit inside the vessel, and carefully covered over with the protected powder; when the former exploded, it simply blew what was above it into the air, and had no effect in igniting the great mass which lay beneath and around it. Thereafter a portion of that surrounding mass was riddled in the usual way, and the residue exploded as ordinary powder will explode. We may assume this test to be conclusive, and proceed to mention a few of the advantages accruing from the practical use of the invention.

In the first place, the cost of the carriage of ordinary gunpowder is £7. 10*s*. per ton, the highness of the rate being, of course, caused by the dangerous properties of the material. The carriage of a ton of protected powder for the same distance is 10*s*. But, if mixed in the proportion which Mr. Gale suggests as being indubitably safe, there are three tons weight of his powder to every ton of gunpowder; so that the cost of carriage of an actual ton of gunpowder, accompanied by its sufficient quantity of protective material, is £2, thereby saving £5. 10*s*. per ton.

Then, as to storage of gunpowder, great difficulty is experienced in obtaining sites for magazines, Government not allowing above a certain quantity of powder to be stored in any mill or magazine, however remote or apparently safe. Mixed with Gale's protective material, it matters not where the powder be stored. Thousands of barrels might with perfect safety be placed in vaults beneath the House of Commons, and a dozen black-visaged Guy Fawkes's allowed to brandish torches in whatsoever subterranean Walpurgis-dance they pleased. The cost of forming shell-proof magazines within our shore batteries is at once done away with; and the enormous expense of building strong powder magazines in or near large cities is no longer necessary. Iron ships need no longer resemble gigantic bomb-shells which only require a spark to send them flying into the air; barrels of this powder may be kept with perfect safety on the deck of a ship when in action. In short, the cost of the storage of this powder is no greater than that of so many barrels of flour; while the further recommendation—greater than any saving of cost—that thereby the absolute prevention of explosion is ensured, is so apparent that it need scarcely be mentioned.

It requires only to be seen how larger machinery for the sifting of the powder and restoring it to its original state, may be constructed so as to be easily used in a sudden emergency. For, though the advantages which the invention offers to the use of powder at home are sufficiently great, it is necessary to its adoption by the army and navy that its mechanical appliance should be of the swiftest and readiest kind. An objection has been raised on the ground that, after the gunpowder had been sifted, some portion of the protective powder would adhere to the grains. This is not the case, as has been proved by microscopic investigation; though Mr. Gale shows that, though it were the case, it would be no objection, as at present the coating of the powder with blacklead, while in course of manufacture, gives additional force to the explosion.

The material which thus renders gunpowder temporarily innocuous is simply glass ground down to an exceedingly fine powder; various other substances have been tried (especially flint, which, however, became too floury and dusty), but no one has been found so useful and successful as glass. The cost of it, as we have already stated, is 30*s.* per ton, and Mr. Gale is prepared to furnish any quantity of it on the shortest notice, as the advertisements say, at that price. It may be used, besides, for a variety of purposes: scours copper and other metals into a brilliancy sufficient to make the inventor of polishing-paste die of envy. At present Mr. Gale advises three pounds of his powder to one of gunpowder as the safest proportion; but a much smaller proportion renders the gunpowder perfectly non-explosive; with this difference, however, that in equal parts of gunpowder and protective powder the former will burn, though it does not explode. A proportion of two to one burns slowly, three to one allows a few grains to ignite at hap-hazard, four to one is mere dead material. The rapidity with which the powder can be separated is somewhat remarkable; perhaps owing to the nature of the material with which it is mixed. The proportions we have mentioned are weight, not bulk; protective powder being heavier than the gunpowder, what forms a proportion of three to one in weight is only two to one in bulk, and this is an important fact in considering storage. Another advantage offered by this material is that it keeps the powder perfectly dry, however the mixture may be exposed to the air; and it is well known that by itself gunpowder rapidly absorbs moisture from the atmosphere and becomes for the time useless.—*Daily Paper.*

The following letter on "Mr. Gale's Gunpowder," which appeared in the 'Times,' Aug. 4th, from "V. D. M.," Royal Arsenal, Woolwich, will be read with interest:—

The account which appeared in your columns on Thursday last of experiments with Mr. Gale's gunpowder, and more especially the closing paragraph of that account, distinctly convey the idea that the making gunpowder non-explosive on Mr. Gale's plan is original. It may interest your readers to know that the system was not merely "vaguely imagined," but actually tried on a large scale, by M. Piobert, the well-known French writer on gunpowder, in 1835, and by M. Fadéieff, Professor of Chemistry at St. Petersburg, between 1840 and 1844. Some of the results of these researches will be found in Piobert's 'Traité d'Artillerie, Théorique et Expérimentale,' pages 213 to 220, and in the 'Comptes Rendus' of the Académie des Sciences, vol. x. p. 320, and vol. xxiii. p. 1148. Nor is it a fact that the substances used for this purpose were, "by their ready absorption of damp, entirely unsuited for the end in view." Sand, it is true, was used by Piobert, but sand in a pure state. The silica of the laboratory is not an absorbent body; while it would probably be found by experience that finely powdered glass would become absorbent, since it is well known that glass does become alkaline in course of time. But Piobert used other substances, which he preferred, partly because the gritty nature of sand presented an element of danger. He found that any of the constituents of gunpowder finely ground met the required end, and of the three he preferred saltpetre, as being the one which gave experimentally the best results. M. Fadéieff tried a variety of substances, and ultimately gave the priority to a mixture of wood charcoal and mineral charcoal (graphite); and among other advantages of this "carbo-graphite" he claims for it that of being unaffected by moisture. ("*La présence de l'humidité n'altère en rien ses propriétés.*") So much for the substances employed.

Let us now see if the principle of M. Piobert's plan was the same as that of the plan now advocated by Mr. Gale. It is necessary here to explain briefly the action of fired gunpowder.

Gunpowder does not, as is often supposed, explode instantaneously on being ignited; it burns rapidly, it is true, but progressively, and its degree of explosiveness depends mainly upon the rapidity of that burning. Evidently, then, anything which tends to diminish its rapidity of burning tends also to diminish its explosiveness. Now, the rapidity of burning is enormously influenced by the facility to the expansion of the gases generated by the first ignited grains. The requisite facility is afforded in ordinary gunpowder by breaking it into grains, and so creating a number of interstices, dependent for their size and extent upon the size and shape of the grains, through which the gas can readily wind its way. Now, if these interstices are filled up with a foreign substance, in proportion to the quantity of that substance, and the completeness with which, so to speak, the pores of the powder are closed, so must the rapidity of burning of the powder, and hence its explosiveness, be diminished. If enough of the substance be added, as in Mr. Gale's mixture, each grain being then actually shut off and separated from its neighbour, the powder cannot burn at all, and the result described in your columns follows. Piobert's experiments showed that the powdered substances need not even be non-combustible; on the contrary, sulphur, charcoal, and saltpetre, gave better results than sand; indeed, finely powdered gunpowder introduced between the grains will itself materially retard inflammation, and it is well known that "mealed" or "dust" powder burns less rapidly than granulated powder, from this cause; and, similarly, the explosiveness of powder which has become "dusty" is much diminished. Where, then, is the difference between Mr. Gale's system and that of MM. Piobert and Fadéieff? The one used powdered glass, the others employed various powdered substances more or less suitable. The Englishman adds rather more of his glass, and so prevents his powder from burning at all; the Frenchman added as much as he thought necessary to diminish the rapidity of burning to the point which sufficed to deprive the action of the powder of its dangerously explosive character; and, instead of employing 3 to 1 or 4 to 1, like Mr. Gale, used only 1 to 2.

I must not venture to trespass upon your space with lengthy extracts from Piobert's work upon this subject. The references which I have given will be sufficient for such of your readers as may care to inquire further into this matter. I have no wish to detract from Mr. Gale's merits, but *palmam qui meruit ferat.*

Nor do I wish to pronounce an unfavourable opinion as to the practical value of the plan; indeed, in the absence of experiments on a much more complete and extended scale than those which have yet taken place with Mr. Gale's powder, it would be unfair to do so; but it should be noticed that the objection which you refer to on the score of increase of bulk is by no means the only one which presents itself. For example, the shooting quality of the powder will, of course, depend upon the completeness with which the sifting process is performed; and here we have at once a serious element of uncertainty, the extent of which, in these days of accurate shooting, will be readily appreciated. Then, again, it is a question if the glass will not destroy, in a great measure, the glaze and surface of the powder, thus materially altering its character. The mixing and sifting processes will always be attended with more or less danger; and it is questionable to what extent the mixture would remain complete in transport, and in proportion as the powder becomes unmixed, so does it become more explosive, and our fancied security, by inducing us to dispense with precautions, might actually lead to the serious consequences which Mr. Gale seeks to avert.

BRITISH PHARMACEUTICAL CONFERENCE, 1865.

The members of Conference are reminded that the meeting for the present year will be held at Birmingham, at the Odd Fellows' Hall, Temple Street. It will commence on Tuesday, the 5th of September, at ten A.M., and be continued on Wednesday, the 6th, at the same hour, and on Thursday and Friday, the 7th and 8th of September, at seven o'clock in the evening.

The Birmingham Committee of Management hope to welcome a large number of those who are interested in the promotion of Pharmaceutical science. In addition to the attractions of the Conference, the simultaneous occurrence of the meetings of the British Association, and the various objects of scientific interest in the town and neighbourhood of Birmingham (many of which will be thrown open to visitors on this occasion), will doubtless ensure a pleasant and profitable gathering.

The Local Secretary of the Conference will be happy to assist intending visitors in securing private and hotel apartments. The lists of apartments prepared for the use of members of the British Association, will be available for members of the Conference.

WILLIAM SOUTHALL, JUN.,
Honorary Secretary.

17, *Bull Street, Birmingham.*

CINCHONA CULTIVATION IN INDIA.

From a report by Dr. Anderson, superintendent of Cinchona cultivation in Bengal, we learn that upon the 1st of April, 1865, there were in the Government plantation at Darjeeling (Himalaya), plants of the following species:—

Cinchona succirubra	7030
— *Calisaya*	37
— *micrantha*	1294
— *officinalis*, including varieties	23929
— *pahudiana*	5092
	37,382

Of this number, 1186 are in the permanent plantation, while 14,162 are stock-plants for propagation.

ABSTRACT OF A REPORT ON THE PITAYO CINCHONAS.

BY MR. ROBERT CROSS.

Mr. Clements R. Markham having been impressed with the importance of procuring seeds of the species of Cinchona which grow at and near Pitayo, New Granada, obtained the sanction of the Secretary for India to employ Mr. Cross in the service. Mr. Cross remarks that most persons who have written on the Cinchona of the Andes represent it as flourishing amidst perpetual torrents of rain and mist, and scarcely ever enjoying a moment of sunshine. He states that this is a mistake. No Cinchona could live in such a climate, nor, even if planted in similar situations, could the trees ripen their seeds, for a certain amount of dry weather and sunshine is necessary for the ripening of the capsules, and for their bursting in order that the seeds may fall to the earth. The Cinchona climate is certainly moist for about six or eight months of the year, and in cultivating this plant it is expedient to seek very humid situations, because the mountains of India do not appear to receive the same amount of moisture as the lofty elevations in America. Nevertheless it will be understood that the natural climate of the commercial Cinchona has been misrepresented by most South American travellers. The Pitayo Cinchona differs essentially from the *C. lancifolia* of Karsten in being a more slender tree, often found formerly from 60 to 70 feet in height, but rarely more than 18 inches or 2 feet in diameter, with very slender branches, bearing small lanceolate leaves, which before falling always assume a purple or deep red colour. The *C. lancifolia* to which Karsten refers extends over a wider tract of country than any other Cinchona on the Andes. This tree, however, is much more massive, and bears considerably larger leaves than those of the Pitayo Cinchona. This large-leaved Cinchona inhabits the western slopes of the Cordillera Orientale, in situations presenting conditions favourable for its development, between Pasto and the city of Santa Fé de Bogota; while the finer kinds of Pitayo bark are limited to a few square miles of steep forest-covered slopes to the northward of the volcano Purace, which belongs properly to the central Cordillera. The map of the Cinchona region of New Granada lately made for Dr. Weddell is very incorrect. It represents certain tracts of country as mountainous, and as covered with Cinchona forests, while in reality they are hot arenaceous plants, or savannas covered with low spreading leguminous trees, where no Cinchona ever grew. Karsten states that the bark is not taken from the roots of the *C. lancifolia*, which, in most instances, is true; but this is not the case with that of Pitayo, the bark from the roots of which is much more valuable than that from the trunks or branches. Further he asserts that the *C. lancifolia* is never likely to become scarce, and that the continual cutting of the Cinchona trees will rather augment than diminish the number of plants; and this may be true concerning his *C. lancifolia*, about which no one cares much, as the yield of quinine is often too small to cover the expense of collecting; but as regards the Pitayo bark there is one thing very certain, that at the present time there is more difficulty in collecting 1 lb. than there was formerly in collecting 1 cwt. The Pitayo bark will very probably be found the best of all the species for cultivation, as it is said to grow very rapidly, which is a matter of great importance. It may certainly be barked when it is 6 feet high, although it would not be an advisable practice to do so before the trees are at least 30 feet high. Bark taken from large trees in Pitayo was said to give nearly 4 per cent., while bark taken from the roots of the same trees gave 5 per cent. of quinine. All the bark taken from Pitayo is said to be sent to France. The bark sold in England under that name is not true Pitayo bark, but comes from the mountains which border on the valley of the Magdalena, and from Almaquer and Pasto, and is certainly from the *C. lancifolia* of Karsten, which as regards quality is very inferior to that of Pitayo. True Pitayo bark may be known in England by not being much thicker than common window-glass—because it is all taken from small plants, the large trees having been destroyed long ago, and by its being full of earthy particles, on account of so much bark being taken from the roots of the plants. Professor Jamieson, of Quito, analysed the Pitayo bark, and found it to contain 3·2 per cent. of quinine. There is, therefore, little doubt that this species, and the *Cinchona officinalis* of Loxa, will prove among the best for cultivation. The climate is like that of Loxa, and even the vegetation of both regions bears a close resemblance to each other. Don Narcso Lorenzano remarks that the principal motive which induced the Government of India to commence Cinchona cultivation, after overcoming so many difficulties, was the fear that the Quina trees would be extirpated in consequence of the 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 for 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 New Granada has a similar practice been adopted. On the contrary, beneficial rules are observed for the conservancy of the woods. The method consists in leaving a part of the trunk, about 3 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 trees germinate freely. This result gives us full confidence that the good kinds of quinas which exist in this country will be permanently preserved.—*Gardeners' Chronicle.*

EXTRACTS FROM MINUTES OF EVIDENCE GIVEN BEFORE THE SELECT COMMITTEE ON THE CHEMISTS AND DRUGGISTS BILL.

Dr. Alfred Swaine Taylor, examined.

(*Continued from page 72.*)

98. Now, with reference to the dispensing of drugs in France, are you aware whether every person who dispenses medicine, not poisons, must undergo an examination?—Or must be a certified man. I wrote a prescription in a French town, and I found it had to go to a particular shop to be made up. In France they generally allow the sale of ordinary drugs which are of an innocent nature, at shops of épiciers, grocers, and

persons of that kind. If you want a prescription made up, no person can do that unless he has undergone an examination as a pharmacien.

99. Are those examinations conducted by the State, or by private bodies?—I am not quite aware of that; to answer your question strictly, I believe there is a college of pharmacy, but there is a power of examining in the country departments as well as in Paris.

100. There are bodies in the country?—At Lyons and Montpellier. In France, they have what are called faculties in some of the principal cities. These faculties are empowered to examine and to license for country practice in the district in which they are; but in the higher grade of pharmacien it is necessary for the persons to undergo a more strict examination, and they must be examined in Paris.

102. Do you think it would be possible to establish in this country, looking at the state of the population in Wales and Scotland, a system by which, whoever in any village or small country town ought to be allowed to dispense medicines, should go through an examination?—I would say, in answer to that, the difficulty of having to apply to a country vendor, with the railway communication there is now, for the making up a prescription, would be a great point to the safety of the public. I think I would not allow any medical prescription,—and I would take it as the basis of all the evidence I give you,—no medical prescription should be made up except by an examined person. I would not take medicine, and I would not recommend a friend to take medicine, compounded in village shops. I do not say it is always wrong, but persons run a great risk.

103. It might not be internal, but external?—There is equal danger; oil of vitriol might be used instead of something else.

104. There is such a thing as a choice of evils, and you might find yourself in that position; you had no means of getting this, and you wanted it immediately, and the person had to take the chance of whether he would go to a person who was thoroughly competent, and do without the laudanum, or he would choose the other evil, and go to the person not competent?—That is a matter of opinion; I was going to try and put myself in the position. Suppose I am in a small village or town, and I saw there was some medicine required to be made up, and it was a question of whether one would wait to get it from a country town, where there was a regular druggist, or have it made up by a man known to have undergone no examination; I should prefer waiting for an opportunity till I could put it fairly into the hands of a man who knew what he was about. The unexamined person may go right, or he may go wrong, from not being acquainted with the art of compounding drugs.

105. Would you deprive a man of the power of exercising that judgment for himself whether he would or would not do so?—Yes, I would.

106. Would you look more to the safety of the public, and rather lay down strict rules from which there is to be no departure?—I would.

107. Do you think that would go down in this country?—I think, after a time, that this strictness would wear off.

108. After what time?—It would be very much felt at first, no doubt. Anybody may go and buy anything anywhere, and of course feel a great restriction from any legislation that might be attempted. There was much the same difference more than a hundred years ago, in the reign of George II., when the surgeons were separated from the barber surgeons. That was a complete severance of a sort of body or combined body that existed from the time of Henry VIII., and it was considered the barbers were seriously damaged in being parted from the surgeons. Ever since that time the surgeons have gone on as a separate body, and the barbers have been kept separately. It was a question about bleeding and cupping. For a long time the barbers kept up the old plan of bleeding and cupping, and the public felt it was a sort of injustice to take the practice out of their hands. I think it has died off entirely. I do not think anybody now goes to a barber to be bled. It was thought at that time it was an improper interference, that people should not be bled by whom they liked; but the change was borne, and so it would be in this case. At first it would be thought very hard.

109. May a man be bled by a barber now if he likes?—Yes, he may; and he may take the consequence of being bled in an artery instead of a vein.

110. Mr. Black suggested, if you had this examination in country places, you would find great difficulty in getting persons to take up the sale of drugs ?—I cannot agree in that view. I think the trade of chemist and druggist is very widely diffused, and I believe it to be a very profitable one ; and, if anything, I think there are too many in it.

111. Supposing it was desirable, as in France, to prohibit certain medicines which are poisons from being sold without certain restrictions, do you not think this would meet what is wanted to a certain extent; that the people should by what is written over their shops be able to distinguish whether a man has been a well-educated man or not ?—Yes.

112. And if they go into one shop where there is a sign, if that man has gone through a certain standard examination, and they go into another shop where there is no such outward sign that he has had an education, they would go at their peril ?—Yes.

113. Would not that be a middle course between the two cases, which is, that no man should dispense medicine without a thorough examination, and the present system ?—That would be on the principle of *caveat emptor.* If you will allow me to suggest, we should take rather a wider view than that. People cannot judge about medicine, or what may be put into a bottle, as they can in purchasing any other things. I think that rule would hardly apply if we were to consider the safety of the public. With regard to the danger a man would go through, we should not prefer the chances of death for a person ignorant of the properties of drugs. No person should be licensed to make up a medical prescription except a person educated to the business. You say very truly they might at their own risk do so, and if it were like a surgical operation I should say yes to your question. Take this case: no man would go to an ignorant and an uneducated person for the purpose of having a leg taken off, but he might go into a shop, thinking there was no great difference, as there were the same kind of toothbrushes, and soap, and other things for sale, and he might consider one shop was as good and as safe as the other. But, in place of medicine, he might have handed to him a substance that would kill him outright.

114. Is it not so with regard to the medical profession; under the Medical Reform Act no man can put up certain titles; if he does, he would be rendered liable to a prosecution ?—Certainly.

115. But a man is not restricted from acting; this is a case in point; the public can go to that man, and they can go to the other side of the street, and go to a man who has not been examined ?—Allow me to make this observation. A person requiring a serious operation performed would, of course, have sense enough to know it would never do to trust himself into the hands of a person not examined. That is not the position of a person going to have medicine made up. I would suggest to you that the Legislature should really interpose to protect him against his own confidence and ignorance in a matter in which he would not be a good judge. He might be, with regard to surgical operations, but he would not be as regards prescriptions. He would not know whether the shopkeeper put in prussic acid or distilled water, but he would know whether a man was capable of using properly the amputating knife.

116. Do you think there is any difficulty in doing that by which those who run may read ?—Certainly not.

117. Supposing registrations were had, and it was known that he employed certain indications, and those were wanting ?—I think if you were to apply that knowledge to persons, you might do some good ; but you would not do the amount of good you would by confining the sale only to authorized men.

118. Admitting what exists in France, and what you have pointed out as the best way, you have stated there would be a great difficulty in this country, where everything is free, to submit to these restrictions ?—Yes.

119. Would not such a middle course as I have suggested be a step in the right direction, which might be adopted, and lead to what might be a perfect system ?—I think it might. If you fix the date after which all persons keeping drugs and poisons should be bound to produce evidence of their fitness by examination, I see no harm in dealing with that retrospectively. I seriously advise the Committee not to allow men to hold themselves out to be what they are not.

Dr. Brady.] 167. Have you made up your mind as to the fact that there is a necessity for legislation?—Yes, I have; I have considered the matter for some years, and especially with reference to a Poisons Bill brought in some years ago, and also with reference to this Report of poisoning which I drew up for the Board of Health.

168. Do you think all persons who dispense medicines should have a fair education?—Yes, I think so, and have a fair examination. I would not take it out of the department necessary for the knowledge of drugs or prescriptions.

169. Do you think by a better education, and giving a better standing to chemists and druggists, they would improve the medical profession proper?—I certainly think it would have this good effect. It would give many benefits to the medical profession as to the safety of prescriptions being made up. It is a part of the profession, and the change would be a general improvement. I may state my opinion, that I think the state in which the profession of pharmacy and the profession of drugs has been allowed to continue in England is a disgrace to us.

Mr. Ayrton.] 226. I understand you that a person who sells a number of commodities like tea and coffee, and articles of that kind, ought not to be allowed to sell poisonous substances, all kept together?—A village shopkeeper should not be allowed to keep them; but, if he did, he should keep them apart from articles of food. I do not see that there is any necessity for his selling them, in reference to public convenience, compared with the great danger of life, and the known destruction of life by the sale of them. I do not see there is any necessity for any but educated persons selling these articles.

227. Is not arsenic a thing used for many commercial purposes?—Yes, but I would not allow it to be sold, except under restrictions. Almost all medicines we have are poisons; it is a question of doses, and we cannot make a distinction between them.

228. How do you propose to prevent the accidents you mention occurring by the Bill before Parliament?—I think, in the sale on a large scale, of large quantities of these articles, especially a poisonous article, there should be some label or instructions on the article as sold, that people may be warned. It is a disgrace to our system that such articles should be allowed to circulate without anything on them to warn the public of the excessive danger. I do not see that we could do anything to prevent the sale, but we might see that the poison is strictly labelled in passing from hand to hand.

229. Looking at the French schedule, are you aware what the object of that is; is it to prevent subtle and insidious poisons being sold, to prevent the abuse of them, or to prevent errors?—I think both; but I think the two poisons mentioned are prohibited.

230. Would it be an accurate description to say they do embrace the most insidious poisons for the destruction of life?—Yes.

236. What would you suggest as to the expense of any mode of carrying out the system of examination?—I think all that would be necessary would be this: that the person should present himself for examination on the subject of botany, in so far as it relates to medicine and *materia medica;* that would be one point. Then the combination and properties of drugs with pharmaceutical chemistry, and the doses of the different medicines; also the power of reading Latin prescriptions with facility, and a general knowledge of the common poisons.

237. When you spoke in your previous answers of an educated person, you meant a person who complies with what you have stated?—Yes; undergone an examination.

238. How would you propose to get up the people in villages?—As to chemists and druggists?

239. Yes?—I think the answer may be put on this basis, to be safe to the public. I would advise that the examination should not be so strict as that required for the medical profession. I would suggest that it should not be left entirely to any one body, but that a Board should be constituted, in which there should be two members of the medical profession. I am only putting this as a suggestion to the Committee. Two members of the College of Physicians should be associated with the examiners, and they should examine candidates on their knowledge of prescriptions written on the spot, and at the same time test their general knowledge of the doses of medicines. Writing prescriptions and prescribing doses are matters belonging to the medical profession, and I think they would be a very great safeguard in another way, it would

prevent the examination from being so severe, on the one hand, as to restrain the trade, and at the same time so loose as to allow improper persons to enter.

Mr. Roebuck.] 264. That will include all poisonous substances?—I have already said there is no difference between poisons and medicines. I can put that fact before you. Here are two packets of the same substance (arsenic); one is a poison, the other is a medicine. (*The Witness produced two small packets in paper.*) That is a medicinal dose of arsenic (one-twentieth of a grain). Here I have the same substance in another form. That is the poison (a packet containing two grains of arsenic), and this is the medicine (*pointing to the two packets*). All I can say is, a medicine, in a large dose, may act as a poison, while a poison, in a small dose, may act as a medicine.

303. I want to know whether it is requisite to institute an examination of all persons?—We agree, in reference to innocuous drugs, it is not required.

304. In all cases of innocuous drugs no examination is required?—Not for the safety of the public.

327. You can make laurel-water in the house?—It requires a little skill, but it can be done. With regard to these poisons, such as hemlock and nightshade, the poison is in the plant, and it is very difficult to extract it. No one would let a stranger obtain any of the alkaloids. If you attempt to use the plant by itself, it has a strong taste. It is powerful, and noxious. We owe it to the credit of a large number of chemists and druggists, and Pharmaceutical Chemists, that they have themselves done what the law has left free; they have put restrictions, of their own accord, on the sale of these very dangerous substances, or the extent to which life might be destroyed in London and large towns would be very great indeed. There is an eminent chemist in London who deals in these things, and he told me this: At the time of Palmer's trial public attention had been called to the subject; and a person came into the shop, and requested him to prepare ten pills with one grain of aconitina. This gentleman, who had a knowledge of the proper dose, said, "If you are a medical man, you must know that one of these pills might be a fatal dose, and I decline to make them up."

Mr. Ayrton.] 330. Do you think, according to your meaning, you could seriously assist in preventing poisoning, unless you passed a law to prevent these active poisons being sold without a medical prescription?—No, I do not think I could. I believe, as I have already stated, a great deal is already done by respectable chemists to prevent danger to life; but what the public have to fear are, the ignorance and carelessness of those who are in the lower branches of the trade.

Sir Fitzroy Kelly.] 335. You have shown there are some considerable difficulties in drawing the line in the way of prohibition in the sale of poisons, both as to persons who sell and things that are to be sold; do you see any difficulty or complication at all in subjecting to an examination chemists and druggists in relation to the making up of prescriptions in the ordinary form, Latin?—I see no difficulty; I think it will be like the Apothecaries' Society starting with a sort of compulsory examination, which would not preclude the selling of these things. It would be desirable, in the first instance, not to have too severe an examination, and to accustom the public and the profession gradually to it; the Apothecaries' Society succeeded in that. Their Act has been in operation since 1815; and, after a period of four or five years, they added to the subjects for examination. There is at present a great confusion between the medical profession and the druggists' profession with regard to the sale of drugs. Druggists do not require such a high standard of knowledge as a professional man must have, therefore of course it would be improper to make an examination so stringent as to create a monopoly.

Mr. Ayrton.] 337. The great bulk of medical prescriptions embrace the selling of innocuous drugs?—Do you mean medical as distinguished from chemical?

338. According to Dr. Abernethy, nine-tenths of the disorders spring from derangement of the stomach, which are cured by simples, and giving things like aconite is quite unnecessary?—Yes; the fact is, if a period was fixed, it might lead to the absorption of the lower trade into a better class of persons, beginning at first with the lowest class. As you are aware, there are some apothecaries, now living, who have only their license to practise by, having practised before the 1st of April, 1815; I have seen one of them in twenty years; but the greater number have died off, and

there is now a better class of men altogether, and that, I think, will be the effect of legislation with respect to druggists. Just before the Apothecaries' Society was founded, there was similar confusion and difficulty as to who was an apothecary and who was not. The time will come round when the present low class of druggists will be absorbed into the general body; and I believe the profession and the trade itself will be benefited by the result.

Sir Fitzroy Kelly.] 339. I understand you are distinctly of opinion that the examination should be an easy one, so as not to interfere with the trade, and I understand you to chalk out that two persons should be duly qualified to go about as examiners?—I think it would require that two examiners for examining in medical botany and the properties of drugs, or what is called *materia medica*, and two other examiners for examining in pharmaceutical chemistry,—that is, chemistry required for the purpose of preparing compounds and in medicine; and then I would, for the protection of the public, suggest that two Fellows of the College of Physicians should be placed on this Board of Examiners, for examining the candidates on the doses of medicines, and whether they can read ordinary medical (Latin) prescriptions. Druggists ought to know the doses in which medicines should be given.

340. And that examination you would mean to be throughout the country, or is it to be in one particular place?—It might be by examiners travelling, or by an examination in a fixed place, as they do in France. It would be a great point to have the examination in London, as is the practice in the medical profession. We allow any number of schools anywhere, but the examinations are always in London.

341. But do you not see any difficulty with regard to the evidence you have given as to the necessity not too much to interfere with the sale of drugs; do you not see a difficulty in bringing anybody up to one point?—But in this respect my view is prospective, not retrospective. If an order were made that, after such and such a day, no person who has not undergone examination should deal in poisonous drugs or compound medical prescriptions, then the rule would be soon observed. With regard to the Apothecaries Act, after August, 1815, it was thought that many were treated with hardship. It will be thought by some to be a hardship to interfere with the druggists' trade by any legislation now. I am not asking you to force an examination on chemists and druggists over the country; I do not see the necessity for that. I think they should be allowed to enrol themselves as a company or society without examination, and this should be for those who are to come hereafter.

342. Would you begin by making the examiners pass an examination?—There are already men who have been appointed by the Pharmaceutical Society, men of ability, who are well known to be able to conduct examinations. The same difficulty existed in reference to the charter of the College of Surgeons; there were Fellows and Members, and the old members were aggrieved because they could not become Fellows except by examination. The college passed a bye-law, that a member might become a Fellow by examination at any time; and, with regard to old members, they should be admitted as Fellows after a certain date, on the payment of a fee for the Fellowship: in that manner all were satisfied.

Lord Elcho.] 356. You would not propose they should be paid by the State?—No; the candidate would get such a benefit by a document of this kind, authorizing him duly to practise, and would have an advantage by the suppression of an illicit and underhanded trade, that he might easily afford to pay a certain sum for examination and diploma. After all, the diploma in pharmacy need not go to more than five or six guineas, and that would be sufficient. The diplomas for the medical profession are very costly; they provide ample funds for paying examiners.

Mr. Ayrton.] 365. You have a list of articles that you think persons should not dispense; what is the necessity of education being carried beyond a knowledge of the details of the articles mentioned in the list?—I think it should go beyond that: he should know the properties of chemicals generally.

366. If he knows that, he would be qualified to sell them?—Yes. Therefore I say the examination should at first be made easy, and then I think the public would be satisfied.

Sir Fitzroy Kelly.] 369. Would you not require the power of distinguishing between one substance and another, where two happen to resemble each other?—Yes; that requires some skill and knowledge.

370. Besides the knowledge of the properties?—I would say that the examination should be more practical than theoretical. These substances should go before them, and the knowledge of them should not be tested by what they could get up by reading, but by actual observation.

(*To be continued.*)

ALLEGED POISONING BY ATROPINE.

Mr. Charles Gordon Sprague was committed for trial by the magistrates of Ashburton on the charge of administering poison to his wife, father-in-law, mother-in-law, and servant. The whole party were taken ill after eating a rabbit pie. The symptoms, according to Mr. Gervis and other surgeons of Ashburton, were those of poisoning by belladonna or atropine; they were a rash resembling urticaria, dilated pupils, vomiting, incoherency of speech, and inability to walk. Atropine was proved to be in the possession of the accused, and Mr. Herapath, sen., of Bristol, deposed from experiments he had made "that he was convinced that atropine had been introduced into the interior of the pie." Bail for £1000, and two sureties of £500 each were accepted,—Mr. Chalker, the father-in-law, himself one of the persons alleged to have been poisoned, offering himself as bail for the full amount.

The trial took place at Exeter, before Mr. Justice Keating, August 1st, when the evidence adduced failed to criminate the prisoner; and, although it was stated that atropine was detected, dilatation of the pupil having been produced by the application of a solution of a portion of the pie, yet it was proved that the prisoner was away before the time when the pie was made, and there was no evidence that he was seen near the place. His lordship, therefore, directed the jury accordingly, who returned a verdict of "Not Guilty."

The following is the process adopted by Mr. Herapath in his analysis:—

"The leg of the rabbit was introduced into dilute hydrochloric acid, and allowed to soak therein, in order that any narcotic poison in the rabbit might be dissolved out. The tests used were applied also to a solution of atropine, prepared by himself, with similar results. He applied to have the symptoms stated, in order that he might know what class of poisons to test for. The tests he applied gave indications of one of three poisons,—atropine, daturia, and aconitina." Mr. Herapath stated that he believed that atropine had never been eliminated from an animal substance before. It had never been communicated before to the scientific world, but that now he should be put on his trial quite as much as the prisoner.

In reference to the above case, Dr. Ogle, of Clarges Street, in a letter to the 'Times,' August 4th, observes:—"The trial of Mr. Sprague for attempted murder has ended in a verdict of 'Not Guilty.' The world will infer that there has either been a failure of justice, or that, if he be innocent, there is some unknown poisoner at large. Either supposition is an unpleasant one. Is there no escape from the dilemma? Is it quite certain that any crime at all has been committed? I think not.

"That the Chalker family were poisoned by belladonna is beyond all doubt. That this poison was contained in the rabbit is also a moral certainty. But is it necessary to suppose that it was put there by any human being? Both prosecution and defence seem to have taken this for granted. Neither seem to have known that though belladonna is a virulent poison to most animals, yet that rabbits eat it, and other poisonous plants of the same family, with perfect impunity.

"It is now some forty years since this fact was demonstrated experimentally by M. Runge, of Berlin. A rabbit was fed for no less than eight days exclusively on the leaves of belladonna, hyoscyamus, and datura—all poisonous plants of the Order *Solanaceæ*, and at the end of the time the animal was as healthy as at the beginning. There was not even the slightest dilatation of the pupil, which in other animals results from a very small quantity of this plant.

"Had that rabbit been made into a pie, those who ate of it would doubtless have shown symptoms of poisoning; for M. Runge found that the poisonous principles had not escaped without absorption, but had been taken up into the animal's body.

"Now the belladonna grows in just such places as rabbits love to haunt—in shady nooks and deserted ruins. It may be found in blossom there in the month of July—the very month, that is, in which this disaster took place. What more likely than that the rabbit which furnished that unhappy dinner had fed abundantly on this plant, and that its flesh was impregnated with the poisonous principle? I, for one, would rather hold this view than believe that so hideous a crime as that of wholesale poisoning had been committed."

In reply to the above, Dr. M'Gill, one of the medical witnesses for the prosecution, writes:—"Dr. Ogle says he has no doubt 'that the Chalker family were poisoned by belladonna, and that the poison was contained in the rabbit.' There is certainly no doubt of the poison being in the pie. Atropia was found by Professor Herapath not in the rabbit but on the surface of the rabbit's leg, and also in a little of the scrapings from the pie-dish. Supposing the hypothesis advanced by Dr. Ogle to be correct, viz. that the rabbit in question had been partaking of the belladonna plant to excess, and so poisoned its consumers, the analysis ought to have brought to light the presence of malic acid, with which atropia exists in combination with the plant, and also pseudotoxin, phytolacca, gum, wax, chlorophylle, salts, etc. None, of these, however, were found, the only substances discovered in the pie not belonging to sound or healthy flesh being common salt and atropia.

"It also seems very strange that of the thousands of belladonna-eating rabbits annually sold and consumed in England, this solitary rabbit should be the only one ever having produced such symptoms. Cases of poisoning after partaking of animal food are by no means rare, and a case is mentioned in the 'Lancet' of September 13, 1862, in which ten persons were dangerously ill after partaking of a rabbit pie, but on none of these occasions were there the symptoms of poisoning by atropia.

"Goats use hemlock as an article of food, but in no instance ever published has their flesh when eaten by man produced the symptoms of poisoning by conia, and many animals used as food by man consume substances of which man could not partake with impunity."

The following is Dr. Ogle's rejoinder:—

"Dr. M'Gill brings forward four arguments to refute the hypothesis by which I have attempted to explain the poisoning case at Ashburton. His arguments are these:—

"1. The poison was found, not in the rabbit, but on its surface, and also in the scrapings of the pie-dish.

"2. None of the other substances besides atropine which exist in belladonna—viz. malic acid, pseudotoxin, phytolacca, gum, salts, chlorophylle—were discovered in the analysis.

"3. Persons are sometimes made ill by rabbit-pie when there has been no poison mixed with it.

"4. The flesh of animals which have eaten poisonous herbs—as that of a goat after eating hemlock—is not known to be poisonous.

"Allow me to say a few words on each of these arguments separately, premising that I have no fuller account of the evidence than that given in your columns.

"1. There is no evidence that the substance of the rabbit's leg did not contain atropine. The fluid obtained by soaking the leg in water was found to contain this poison, and it was inferred that it was derived from the surface; but no attempt was made to analyse the deeper portion of the flesh. Even had such been made, and no poison found, this negative evidence would have been insufficient to establish its absence, for Dr. Herapath states in his evidence that such is the difficulty of detecting this substance when mixed with organic matter that it had hitherto baffled all chemical analysis. That some of the poison should escape into the dish with the meat juices during the process of cooking is not surprising.

"2. The substances mentioned by Dr. M'Gill exist in belladonna, and some of them, at any rate, in other, and, in fact, in almost all plants. In order for the argument to be of any weight, Dr. M'Gill must show that these substances are capable of absorption uncharged from the stomach or intestines; that when absorbed they are capable of detection, and, chief of all, that in this individual case they were searched for. The last of these points is enough for my purpose. No search was made for them, so that it is not astonishing that they were not found.

"3. I am unable to see the force of the third argument. It would have some weight were it intended to show that neither belladonna nor its alkaloid, atropine, was concerned in the matter; but it has no bearing on the point at issue, which is whether the poison can have got into the rabbit by other than human agency.

"4. I come now to the most important of Dr. M'Gill's arguments, that the flesh of animals fed on poisonous herbs is not poisonous to man. The instance which Dr. M'Gill gives of goats feeding on hemlock may be at once dismissed. The flesh of such an animal, when cooked, would not be poisonous, for the poisonous principle contained in this plant is volatile, and disappears during the process of cooking. It so chances as that there is a case on record which admirably illustrates this, and which is related in the 'Lancet' for June 24, 1843. A number of persons were poisoned by eating hemlock in a salad, though the cook had a few days previously plucked a quantity of leaves from the identical plant, mistaking it for chervil, and used them in her soup, without any ill resulting to those who partook of it. Atropine is not thus got rid of in cooking, as may be seen in a case also recorded in the 'Lancet' (August 29, 1846), where a family was poisoned by eating a pie made with belladonna berries. The instance, then, of the goat and its hemlock may be dismissed. We have, however, positive evidence that the flesh of animals fed without harm to themselves on poisonous herbs becomes poisonous to man. The pheasant of Pennsylvania feeds, during the spring, on the buds of the *Kalmia latifolia*, one of the few shrubs which preserve their verdure during the cold season, and is deemed poisonous at that season; an opinion in which Beck, a valuable authority on medical jurisprudence, agrees. In the 'Medical Gazette' (xxxi. p. 237) the case is recorded of a family at Clermont, near Toulouse, who fell victims to a dish of snails, which had been collected from the poisonous plant, known to botanists as *Coriaria myrtifolia*, but called 'rondont' in the *patois* of the country. An example still more to the purpose is that of bees fed on Datura, a plant which contains a poison, if not identical, at any rate very similar to atropine. The honey derived from these bees has long been known to be poisonous, and Dr. Barton, who has paid attention to the subject, recommends the removal of all fetid or poisonous vegetables from the neighbourhood of hives. (Beck, Med. Jurispr. 855.)

"In conclusion, Sir, let me say that I think I have clearly established the following points:—Rabbits will eat belladonna without injury to themselves. Animals fed on poisonous plants, though themselves uninjured, may be poisonous to man. There is no evidence that such was not the case with the famous rabbit of Ashburton."

POISONING BY PRUSSIC ACID.

On Saturday, August 5th, a man called at the Star Coffee House, Red Lion Street, Holborn, to know if he could be accommodated with a bed-room for three children for a few nights. On the Monday he called again with the children, and, having seen them to bed, he left, and called again the following day, when, in the evening, he again saw them to bed.

On the following morning, as the children did not make their appearance at the usual hour, one of the chambermaids entered the room and found all the children dead, evidently from poison. Having effectually disposed of these poor children, the man, who appears to have passed under the names of Southey and Forward, had gone down to Ramsgate, and there deliberately murdered his wife and child.

The inquest held upon the bodies of the three children was adjourned for the purpose of receiving the report of Dr. Harley's analysis, and was resumed on Tuesday, Aug. 15th. The following is the result of Dr. Harley's investigation:—On removing the lid of the jar containing the viscera of the youngest of the three children, an odour resembling that of myrrhane, or of cherry-laurel water, became perceptible. The viscera consisted of the stomach, intestines, liver, kidneys, and part of the brain. All were perfectly healthy, though somewhat congested. In the stomach were about six ounces of semi-digested food, with an acid reaction. As the suspected murderer stated that the children were poisoned with nicotine, the active principle of tobacco, that poison was carefully looked for in the stomach and other viscera, but with an entirely negative result; whereas the analysis yielded distinct evidence of the presence of prussic acid. No other poison was detected. The jar containing the viscera of the second child was next examined. It had a similar odour to the other, though not so strongly marked. The organs were the same as in the previous case, and all were equally healthy and congested. Nicotine was again specially looked for in the viscera and their contents, but not a trace was detected; while, on the other hand, unmistakable evidence of the presence of prussic acid was again obtained. Jar 3, containing the viscera of the eldest boy, on being opened, smelt strongly of bitter-almond oil. The organs it contained were the same as in the other cases, but in this instance they were not healthy, being not merely congested, but the actual seat of tuberculous disease. The stomach contained about eight ounces of tolerably digested food, with an acid reaction, and in this instance yielded more prussic acid than the other two put together. No nicotine was detected. Second examination of the fluids in the phials:—The liquids which flowed from the mouths of the two eldest boys yielded distinct evidence of prussic acid. Having arrived at the conclusion that each of these three children had received a poisonous dose of prussic acid, it yet remained for me to try and discover how the poison had been administered. Two bottles and a glass had been found in the rooms; these were next examined. The six-ounce medicine bottle found in No. 8 was labelled "Chalk, etc.; a tablespoonful every three or four hours, as requisite." It was about half full, and was found to contain prepared chalk, chloric ether, paregoric elixir, and water—being, in fact, an ordinary diarrhœa mixture. It contained no trace of either nicotine or prussic acid. The other medicine bottle, which was found in No. 6, was also a six-ounce one, but of a different shape and colour, being flattened in form and bluish in tint. It had no label, and contained only a few drops of a strongly-smelling liquid, the chief part of which was oil of copaiva. This was the substance which gave to the bedroom its peculiar pungent odour. It contained neither nicotine nor prussic acid.

From the result of the *post-mortem* examination and the chemical analysis, Dr. Harley came to the conclusion that the three children died from the effects of a mortal dose of prussic acid. The tests used were those known among scientific men as the iron test, the sulphur test, the silver test, and the vapour test—all of which yielded positive evidence of the presence of the poison. The inquiry was again adjourned.

COUNTER PRACTICE.

JONES *v.* FAY (Before Mr. BARON PIGOTT, *August 7th*).

This was an action against a chemist for malpractice. The declaration stated, that the plaintiff had retained and employed the defendant for reward, to bestow care, diligence, and skill, as a surgeon and apothecary, in and about the endeavouring to cure the plaintiff of a certain complaint and disorder under which he then laboured, but that the defendant conducted himself so carelessly, negligently, ignorantly, and unskilfully, that by reason thereof the plaintiff became, and was, and still is, greatly injured in health and constitution. The defendant denied his retainer and employment as alleged.

Mr. Serjeant Ballantine and Mr. Haselfoot were for the plaintiff; Mr. M. Chambers, Mr. Denman, and Mr. Willoughby were for the defendant.

The plaintiff was a common painter at Islington, and the defendant a chemist at Kingsland. The plaintiff, who had twice been married, and had a large family, had some years ago had an attack of what is called "painters' colic;" but how far from that time to the period of the matter now in question he had been in good health was a matter rather in dispute. In May last, the plaintiff, having a pain in the bowels, went to the shop of the defendant (to whom he had already resorted on similar occasions) for a medicine; but in the result the plaintiff became very bad, and ascribing the result to the defendant's treatment, brought the present action. The case for the plaintiff in substance was that the attack was one of painters' colic, and for which castor oil would be proper, but that the defendant had given him mercury, which had caused salivation and seriously impaired his constitution.

The plaintiff's wife proved that her husband when he consulted the defendant was in good health, and had worked regularly every day. She knew of his taking pills supplied by the defendant, she administered them herself every or every other night for a month; she asked defendant if she should call in any other medical man, and he said "certainly not," and that "he would get her husband round." At the end of the month, however, she called in Mr. Trend, who still attended him.

The plaintiff himself was called as witness; he appeared in a very enfeebled state, and could hardly be heard. He stated that he went to consult the defendant, who said he would give him some medicine which would soon make him well; he sent his wife for the medicine, and he took all the pills excepting those he gave to his attorney.

A chemical analyst, who had received from the plaintiff's attorney two boxes of the pills, one containing ten, and the other six pills, which had been submitted to his analysis along with a bottle of medicine, was then examined. The pills, he said, were "blue pills," and averaged four grains each. The medicine in the bottle was a simple magnesian mixture, with a little ether and some saline element. The pills in one box were marked, "One to be taken every night," and those in the other "Occasionally at night."

Mr. Trend was called as witness for the plaintiff, and stated that on the 31st of May, he was called in to attend the plaintiff, and found him "suffering from profuse salivation, the result of mercury. His tongue was swelled, and partly protruded. The whole of the salivary glands were enlarged and painful, and he complained of severe pains in his limbs." These were symptoms of mercury, which was not, under any circumstances, proper for the "painters' colic." The proper treatment would be a full dose of opium, followed by a dose of castor oil, and then a saline mixture, with common Epsom salts. The plaintiff caught a cold, and bronchitis ensued. The mercury would make him more liable to cold, and render the case more difficult, and he thought the mercury had a good deal to do with the bronchitis.

This witness was cross-examined a good deal, with a view to show the existence of a hostile feeling towards the defendant.

Dr. Guy, Professor of Forensic Medicine in King's College, and physician to the hospital, was called for the plaintiff, and stated that the proper treatment for painters' colic was, in a slight case, castor oil; if that was not sufficient, opium and then castor oil, the patient being meanwhile kept carefully in bed and warm. In his judgment, mercury remaining in the system to the extent of salivation could never in such cases be proper treatment.

Dr. Harley, Professor of Forensic Medicine at University College, gave similar evidence. Painters' colic, he said, was a very simple disease, and easily treated. The treatment was sedative and purgative. Opium to relieve the pain; some mild purgative to open the bowels. Mercury to the extent of salivation was never given.

This was the plaintiff's case.

Mr. M. Chambers, in addressing the jury for the defendant, said there was a strong professional prejudice against chemists selling medicines, and he thought that one of the medical witnesses was affected by that prejudice, though he admitted that the other eminent medical men who had been examined were entitled to every respect. Contrasting, however, the opinions of the new school with the old, he said it was a case of doctors differing, and it was hard to hold a chemist liable for a course which was sanctioned by those of any school. His client, however, would deny that he ever gave as much as a grain of mercury in any of the pills; and it had not been proved that the pills analysed were his pills.

The defendant was then called, who flatly contradicted the evidence of the plaintiff and his wife, and stated that on each occasion that he was consulted by the plaintiff, he, witness, recommended him to have medical advice; that he never gave him blue pill, but merely compound rhubarb pill and a simple mixture; that the pill-boxes were certainly his, but if they contained blue pills, these must have been substituted for those he gave to the plaintiff.

Dr. Forshaw, a consulting surgeon, stated that painters' colic was a very serious complaint and shortened life (whereas the eminent medical men who were called for the prosecution, stated on the contrary, that it was easily treated, and they had not known any case fatal, if properly treated); he saw nothing improper in the treatment the defendant said he had adopted, though it was not that which he should himself have adopted.

Dr. Helsham, Registrar of the Medical Council, said, having heard the evidence of the last witness, he agreed with him as to the treatment described as adopted.

Mr. Serjeant Ballantine stigmatized the plea put forth for the defence, that there had been a fraudulent substitution of the pills, as monstrous in the extreme.

The learned Baron then summed up the case to the jury. He should, he said, leave to the jury two main questions: first, whether the defendant did undertake to treat the plaintiff for his disorder; secondly, whether he treated the plaintiff so carelessly or ignorantly as to impair his health or injure his system? This would probably become a question whether the defendant had given mercury, and that in the result would practically resolve itself a good deal into this—whether the jury believed the evidence for the plaintiff or the defendant. At one time it appeared that it would be made a question whether treatment with mercury was proper or not, but it was at length admitted that it was not so. There was no question, then, that mercurial treatment was improper, and the main question would be whether it was given by the defendant. That question involved several others. Was the man salivated? If so, how? Was it by blue pills? If so, where did they come from? It could hardly be doubted that the man had suffered under salivation and by reason of blue pills. Where did they come from? Was it probable that they came from some other chemist, and that while getting medicine from one shop the plaintiff was going to another shop and getting mercurial medicine, and then came here to commit the most foul and wilful perjury by swearing that he had it from defendant? None but a madman as well as a most wicked man would so act. It was more probable that there might have been some mistake in the defendant's shop. If the jury believed the plaintiff, the blue pills came from that shop. If they believed the defendant, he did not give them or direct them, but still they might have come therefrom by some mistake, and this was the only suggestion he could make to avoid the conclusion of wilful perjury and conspiracy on one side or the other. The great point was, whether they were satisfied that the defendant administered the mercury to the plaintiff, and so caused the salivation he suffered, and if so, they should give such damages, and such damages only, as arose out of the injuries caused by the negligence of the defendant.

On the return of the jury they gave a verdict for the plaintiff,—damages £100.

Within a week of the trial the man died, and at the inquest held on the body the following verdict was returned:—"We find that the deceased, Henry Fitzroy Jones, was found dying, and did die, from the mortal effects of an attack of bronchitis, with emphysema of one of the lungs, and a diseased state of the heart, and other diseased conditions; and the jurors further say that the said death of the said deceased was the result of natural causes, accelerated by a weakness produced by excessive salivation."

REVIEW.

The Book of Perfumes. By Eugene Rimmel, Member of the Society of Arts, and Reporter of the Jury at the Great Exhibition (Perfumery Class). With above 250 illustrations by Bourdelin, Thomas, etc. London: Chapman and Hall, 193, Piccadilly. 1865.

The object and scope of the author of this volume will be best learned by the following extract from the Preface: he says, "After devoting a few pages to the physiology of odours in general, I trace the history of perfumes and cosmetics from the earliest times to the present period, and that is the principal feature of my work. I then briefly describe the various modes in use for extracting the aromas from plants and flowers, and conclude with a summary of the principal fragrant materials used in our manufacture; in fine, I give all the information which I think likely to interest the general reader."

No recipes are given except those which "from their quaintness are likely to amuse." The author gives no modern formulæ, because "perfumery can always be bought much better and cheaper from dealers than it could be manufactured privately by untutored persons," and for other reasons, which are given in the preface.

The latter chapters on "the Commercial Uses of Flowers and Plants" and "Materials used in Perfumery," are those from which our readers will derive most advantage, but all will be found interesting and instructive. Some few errors we have noticed, but these are not important. The work is beautifully illustrated, deliciously perfumed, and well printed, etc.,—in fact, suited for the drawing-room table as well as for more useful purposes.

The following table, from the appendix, although not free from errors, will be found useful to our readers:—

Principal Materials used in Perfumery.

Names.	Whence Extracted.	Place of Production.
Almond (bitter)	Amygdalus amara	Northern Africa.
Ambergris	Secretion of the Physeter macrocephalus	Found floating on the sea, or on the coasts of India, China, Japan, Greenland, and other places.
Aniseed	Pimpinella anisum	North of Europe.
Ditto (Star)	Illicium anisatum	China and Japan.
Balsam of Peru	Myroxylon peruiferum	Western coast of South America.
Balsam of Tolu	Toluifera balsamum	Ditto.
Benzoin Gum	Styrax benzoin	Siam, Sumatra, and Singapore.
Bergamot	Citrus Bergamia rind	Calabria and Sicily.
Bigarrade	Citrus Bigaradia rind	Italy.
Camphor	Laurus camphora	China and Japan.
Carraway	Carum carui	England, Germany, and France.
Cascarilla	Croton cascarilla	Bahama Islands.
Cassia	Laurus Cassia	East Indies and China.
Cassie	Acacia Farnesiana	South of France, Italy, Algeria, and Tunis.
Cedar	Pinus Cedra and Juniperus virginiana	Syria, United States, and Honduras.
Cedrat	Citrus cedrata rind	South of France and Italy.
Cinnamon	Laurus Cinnamomum bark	Ceylon.
Cinnamon leaf	Leaves of the same plant	Ditto.
Citronella	Andropogon citratum	Ditto.
Civet	Secretion of the Viverra Civetta	Indian Archipelago, and Africa.
Cloves	Flower bud of the Caryophyllus aromaticus	Indian Archipelago, and Zanzibar.
Dill	Anethum graveolens	England.
Fennel	Anethum fœniculum	South of France.
Geranium	Pelargonium odoratissimum	South of France, Italy, Algeria, and Spain.
Ginger grass	Andropogon nardus	Ceylon.
Iris or Orris	Root of the Iris florentina	Italy.
Jasmine	Jasminum odoratissimum	South of France, Italy, Tunis, and Algeria.
Jonquil	Narcissus Jonquilla	South of France and Italy.
Laurel	Cerasus Laurocerasus leaves	Ditto.
Lavender	Lavandula vera	England, South of France, and Italy.
Lemon	Citrus medica rind	Coast of Genoa, Calabria, Sicily, and Spain.
Lemon grass	Andropogon Schœnanthus	Ceylon.
Limette	Citrus limetta rind	South of France.
Mace	Expressed from the refuse nutmegs	Indian Archipelago.
Marjoram	Origanum majorana	South of France.
Mirbane	Nitrobenzine or artificial essential oil of almonds	England and France.
Musk	Secretion of the Moschus moschatus	Thibet, China, and Siberia.

PRINCIPAL MATERIALS USED IN PERFUMERY—*continued.*

Names.	Whence Extracted.	Place of Production.
Musk seed . .	Hibiscus abelmoschus	West Indies.
Myrtle . . .	Myrtus communis	South of France.
Myrrh . . .	Balsamodendron Myrrha . . .	East Indies and Arabia.
Narcissus . .	Narcissus odorata	Algeria.
Neroli (bigarrade) . .	Citrus Bigaradia flowers	South of France, Italy, and Algeria.
Neroli (Portugal) . .	Citrus aurantium flowers . . .	Ditto.
Nutmeg . . .	Myristica moschata	Indian Archipelago.
Orange or Portugal .	Citrus aurantium rind	Calabria and Sicily.
Orange-flower .	Citrus Bigaradia flowers . . .	South of France and Italy.
Patchouly . .	Pogostemon Patchouli	India and China.
Peppermint .	Mentha piperita	England and United States.
Petit grain (bigarrade)	Citrus Bigaradia leaves	South of France and Algeria.
Petit grain (Portugal)	Citrus aurantium leaves	Ditto.
Rose	Rosa centifolia	South of France, Italy, and Turkey.
Rosemary . .	Rosmarinus officinalis	South of France.
Rosewood . .	Lignum aspalathum	South America.
Sandalwood .	Santalum citrinum	India, China, Indian Archipelago, and West Australia.
Sassafras . .	Laurus sassafras	United States.
Serpolet . . .	Thymus Serpyllum	South of France.
Spike	Lavandula Spica	Ditto.
Styrax . . .	Liquidambar styraciflua	Turkey.
Thyme . . .	Thymus vulgaris	South of France.
Tonquin . . .	Beans of the Dipterix odorata . .	South America and West Indies.
Tuberose . .	Polianthes tuberosa	South of France and Italy.
Vanilla . . .	Pod of the Vanilla planifolia . .	Mexico.
Verbena . . .	Aloysia citriodora	Spain.
Violet . . .	Viola odorata	South of France and Italy.
Vitivert . . .	Anatherum muricatum	India.
Wintergreen .	Gaultheria procumbens	United States.

Obituary.

We regret to announce the death of Mr. William Procter, of the firm of William Procter and Son, Newcastle-on-Tyne. He was of a retired disposition, but throughout life quietly advocated free trade and liberal measures, and up to a recent period took a deep interest in matters affecting the drug trade generally. Being a lover of education, he took an active part in the local meetings of the Pharmaceutical Society at its commencement, became one of the founders, and a steady contributor to it and the Benevolent Fund to his death. He had a stroke of paralysis the end of last year, which confined him to the house, from which, however, he seemed to be gradually recovering, but was taken suddenly ill on the evening of the 8th instant, and died within twenty-four hours.

We have also to record the death, at Clifton, July 18th, of Mr. Edwin Ballard, of Faringdon.

MISCELLANEA.

Death from Chloroform.—On Saturday morning, August 19th, it was announced that Mrs. Gregory, the wife of the Rev. Alexander Gregory, the much respected pastor of the Free Church, Anstruther, had been found dead in bed, under circumstances of a peculiarly distressing nature. The particulars of the melancholy event are as follows:—The unfortunate lady was subject to an acute chronic malady, to alleviate the pain of which she was accustomed to make use of chloroform. She had sent her servant for, and procured from the laboratory, in the course of Friday, a considerable quantity of that remedy, for the purpose, it is said, of rubbing the cheek of some member of the family who was suffering from toothache. After partaking of supper she felt somewhat indisposed, and retired to her bedroom about eight o'clock that evening. The first intelligence that anything unusual had happened was given about six o'clock next morning, by the cries of her little daughter, who slept in the same room, and who naturally had become greatly alarmed at the continued silence of her mother. The fastenings of the door which were in the inside, having been removed by the affrighted child, an entrance was obtained by the inmates of the house, when the poor lady was found to have been dead some hours. Dr. Macarthur was promptly sent for; but the cause of death was self-evident, as a handkerchief containing chloroform was found lying over the mouth of the deceased lady. It is conjectured, with every degree of probability, that Mrs. Gregory, feeling herself unwell, had incautiously taken chloroform to induce sleep.

Fatal Explosion of Spirits.—A lamentable accident occurred at Chaumont, in the Haute Marne, on Thursday, June 29th. A servant having approached too near a cask of spirits in his master's cellar with a candle, the spirit ignited. He called loudly for help, and several neighbours came to his assistance. Unfortunately at the same moment the cask burst, and the burning liquid ran about the cellar in all directions. The consequences of the accident were terrible. Ten persons, tradesmen in the neighbourhood, were burnt to death, and several severely injured. At the first news of the accident, the prefect of the department, the mayor of Chaumont, the commander of the gendarmerie, the attorney-general, the parish priest, and the Brothers of the Christian Schools proceeded to the relief of the sufferers. The following evening, ten coffins were borne to the graveyard, followed by the entire population of Chaumont. When the remains were lowered into the graves, the prefect addressed the bystanders in a most touching manner. A subscription was at once set on foot for the families of the sufferers, and about 5000f. were collected in a few minutes.

Preserving Flowers by Glycerine.—Mr. C. R. Tichborne states, in the 'Artizan,' that being desirous of preserving a vegetable *lusus naturæ* for some time, he submerged it in some weak glycerine, considering that that fluid would be less likely to destroy the tender organism, and also remembering that it had been found most efficient in the preservation of animal tissues. The glycerine answered its purpose most admirably, preserving the delicate parts of the plant and preventing decomposition. He immediately saw that this property of glycerine might be made available for certain pharmaceutical purposes, where it was desired to preserve or extract the aroma of vegetable products, such as Elder, Orange, or Rose flowers, and also might be substituted for the oils and fats used in the purest process termed enfleurage. The glycerine need not be especially pure, but should be devoid of odour. The Elder-flowers should be gathered when the corolla was fully expanded, but not too far gone; they should then be plucked from the stem, and packed firmly in wide-mouthed bottles or jars, without crushing them; and the whole should then be covered with glycerine. Mr. Tichborne states that he has thus preserved flowers for two years, and, on distilling them, procured a water the perfume of which has equalled the most recent product. For the preservation of the aroma of the flowers he considers the employment of glycerine far superior to the system termed enfleurage, in which heat is used.—*Journal of Horticulture.*

Poison at the Communion.—A Swedish clergyman, the Rev. Mr. Lindbäck, has been his trial for poisoning at least three of his parishioners while administering to them the Sacrament of the Communion. It appears that when arrested he in the first instance solemnly denied having done anything that could have been the cause of the death of the persons who are said to have been murdered; but, although for a time he seemed to be determined to set at defiance all who had come forward as his accusers, he ultimately showed a disposition to make a full confession, endeavouring, however, at the same time, to obtain in return the privilege of being left at large for eight days for the purpose of putting his affairs in order. To such a condition the magistrates could not of course agree, but it was arranged that he should be taken to his own house and kept under proper surveillance there until he could be conveyed to the prison at Carlstad. During this temporary confinement, he made an attempt to commit suicide by opening a vein with a lancet, but this had only the effect of increasing the vigilance of his guards, who have never since for a moment lost sight of him. When put upon his trial, he at once declared his readiness to plead guilty to the charge brought against him of having given poison in the sacramental wine to Nils Pattersson, the widow Carin, and Daniel Anderson, the last of whom, however, had not fallen a victim to his attempt. He could assign no other reason for having done so but a desire to obtain from his parish the riddance of the burden which the maintenance of those indigent people had entailed upon it; but while he also confessed that he had poisoned the retired merchant, M. Lysen, who lodged in his house, he admitted that in that instance the hopes of gain by a succession to the estate of his victim had been the motive which had induced him to commit the crime. In that case he admitted that the poison had been given on three consecutive evenings in milk, and had consisted of arsenic, which he had extracted from a preparation that had been made for the destruction of rats.—*Pall Mall Gazette.*

According to the confession of the prisoner, since published, he appears to have been a *conscientious poisoner;* for he says that when he witnessed the miseries of the incurably sick, he wished with all his heart that they might be released from such heartrending misery, and he thought, "Were I in such miserable plight, I would bless him who hastened the end of my pain, and God would forgive that merciful one." With this view, he says, "I prepared a separate wine, as help in trouble." He also thought that very few human beings pass to the other world in the course of nature—that is, when the powers of soul and body are worn out by age: some in the full vigour of life are their own murderers, some fall out of the hands of the most skilful physician into the grave. From this view of life, he came to the conclusion "that the merciful God would not condemn me if I shortened the sufferings of a miserable creature!"

BOOKS RECEIVED.

Annual Announcement of the Faculty of Medicine of the M'Gill University, Montreal, for the Thirty-third Session. 1865–66. Montreal: J. C. Becket. (Pamphlet.)

The Surgeon's Vade Mecum; a Manual of Modern Surgery. By Robert Druitt. Ninth Edition, much improved, and illustrated by 360 highly-finished wood engavings. London: Henry Renshaw, 356, Strand; John Churchill, 11, New Burlington Street. 1865.

Bathing; How to do it, When to do it, and Where to do it. By Edgar Sheppard, M.D., etc. Reprinted from the 'Journal of Mental Science.' London: Robert Hardwicke, Piccadilly. 1865.

TO CORRESPONDENTS.

A paper will appear in our next number, by Messrs. T. and H. Smith, on "An Antidote at once for Prussic Acid, Antimony, and Arsenic."

Patent Medicine Licence.—We remind our readers that this licence becomes due on the 1st of September.

Chemicus (Boston).—Apply by letter to the Secretary, Civil Service Commission, Dean's Yard, Westminster.

A Chemist (Belfast).—There are two makers of the article, both claiming the "true and original."

"*Inquirer.*"—Apply by letter to the Secretary, 17, Bloomsbury Square, giving name and address.

A Registered Apprentice (Leamington).—'The Preparation and Mounting of Microscopic Objects,' by Thomas Davies.

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.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VII.—No. IV.—OCTOBER 1st, 1865.

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THE BRITISH PHARMACEUTICAL CONFERENCE.

We present our readers this month with a Double Number of the Journal, in order that full justice may be given to the meeting of the British Pharmaceutical Conference held last month at Birmingham. From the Report furnished to us by the Secretaries, we learn that about seventy members and visitors were present at the different sittings, which extended through the working portions of four days. Among those who attended we notice the names of some of the Council of the Pharmaceutical Society of Great Britain, and of many old and distinguished students of the School of Pharmacy, who are now scattered over the country, and by their labours in the cause of Pharmacy and in the promotion of Pharmaceutical Science are reflecting honour on their *alma mater* and on the profession to which they belong.

At the First Sitting of the Conference, the Secretary read the Annual Report, by which it appears that the number of members has more than doubled during the second year of its existence. No less than one hundred and six members were enrolled at the present meeting, so that the total number now exceeds three hundred. This increase in the number of members cannot but be regarded as most gratifying, and must fully answer the expectations of its founders. With such an addition to the ranks of the Conference we can only express a wish that the next meeting, which it is proposed to hold at Nottingham, in September, 1866, at the time of the meeting of the British Association, will be even better attended than the one at Birmingham, for one of the great advantages we anticipate from such annual gatherings is the promotion of a friendly reunion and social intercourse among pharmaceutists and chemists.

The reading of the Report was followed by the Address of the President, which we have given in full, because, like everything that emanates from Mr. Deane, it demands and will well repay a careful perusal. Well might Mr. Holdsworth, of Birmingham, after proposing "that the best thanks of this Conference are due and be now presented to the President, Mr. Henry Deane, for his interesting and valuable inaugural address, as well as for his uniform interest in the progress of Pharmacy and efficiency of the Drug trade in this country," say "that he had listened to the address with inexpressible pleasure, and had been struck with its manly, hearty, and honest tone."

The address was followed by the reading of papers which constituted the principal business of the Conference. We have not had sufficient time to read these communications thoroughly, but the number, importance, variety, and interesting nature of the subjects treated of in them will be at once appreciated by a reference to the following list, with their authors' names:—"On the Waters of the Pharmacopœia," by Mr. J. C. Pooley; "On Blue Pill," by Mr. F. B. Benger; "Note on Bisulphate of Potash," by Mr. B. S. Proctor; "On the Iodo-Hydrargyride of Potassium and the Oxidation Tests for Methylic Alcohol in the Presence of Ethylic Alcohol and some other Organic Bodies," by Mr. John Tuck; "Can Methylic Alcohol, or any Derivative of it, be readily Detected in Chloroform, Ether, Sweet Spirit of Nitre, and Sal Volatile?" by Mr. John Tuck; "On Eschwege's Patent Wood Naphtha, and its Uses in the Arts and Manufactures," by Mr. John Tuck; "On the Mistura Creasoti of the British Pharmacopœia," also by Mr. John Tuck; "On Ipecacuanha Wine," by Mr. George Johnson; "On Microscopic Analysis applied to Pharmacy," by H. L. Deane, F.L.S., and H. B. Brady, F.L.S.; "Notes on a Commercial Sample of Sulphate of Quinine," by W. W. Stoddart, F.G.S.; "Report on the Processes for the Preparation of Glacial Acetic Acid," by W. E. Heathfield; "On the Strength of Solutions of Phosphoric Acid of Various Densities," by Mr. John Watts; "What are the Source, Annual Yield, and Characteristics of the so-called Volcanic Ammonia?" by Mr. W. D. Howard; "On Emulsions," by Mr. Barnard S. Proctor; "On Aqueous Solutions of Perchloride of Iron, such as Liquor Ferri Perchloridi, Br. Ph.," and "On Spirituous Solutions of Perchloride of Iron, such as Tinctura Ferri Perchloridi, Br. Ph.," by J. Attfield, Ph.D.; "On the Estimation of Nitrites in the Presence of Nitrates," by C. R. C. Tichborne, F.C.S.; "Note on Nitrite of Soda," by Mr. W. D. Howard; "On the Purity of Commercial Bromides and Iodides other than Iodide of Potassium," by Henry Matthews, F.C.S.; "Remarks on Extracts of Meat," by H. B. Brady; "On the Effects of Soil and Cultivation on the Development of the Active Principles of Plants," by Mr. Thomas P. Bruce; "On a New Filter," by Mr. G. F. Schacht; "On the Adulteration of Essential Oils with Turpentine, and Means of its Detection," by Mr. H. Sugden Evans; "Report on the Quantity of Alkaloid in Various Specimens of Citrate of Iron and Quinine," by Mr. J. C. Braithwaite; "Tannin in British Galls," by William Judd, F.C.S.; "On Cotton Seed Oil, and its Detection when mixed with other Oils," by R. Reynolds, F.C.S.; "On Italian Castor Oil," by Mr. John Phillips; and "Report on the best Excipients for forming the Resins of Jalap and Scammony in Pills," by Mr. T. J. Hasselby.

A list, such as the above, which comprises the subjects treated of in twenty-eight papers, is a speaking commentary and substantial evidence of the decided success which has attended the Birmingham Meeting of the British Pharmaceutical Conference in the promotion of Pharmaceutical Science. Much credit is due to the President and other Officers, as well as to the other working men of the Conference, who, by their energy, perseverance, and ability, have achieved such a successful result.

The proceedings of the Conference were brought to a conclusion on the fourth day of its meeting, by an agreeable and interesting Conversazione, which was most liberally given by the Birmingham members to the other members who were present at the Conference. This was succeeded by a supper, and "thus (in the words of the Report) pleasantly terminated a meeting, which was highly successful, both in regard to the number and practical value of the scientific papers read at the different sittings, and in the promotion of that good feeling, friendship, and mutual respect which should ever exist among those following the trade and profession of Pharmacy."

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *6th September*, 1865,

Present—Messrs. Hanbury, Hills, Morson, Orridge, Sandford, Savage, Squire, and Standring, the following was elected a Member:—

Philip Childs ....Newbury.

BENEVOLENT FUND.

The sum of £25, as temporary relief, was granted to a distressed Member, residing in Sussex.

The following were approved as candidates eligible for election as annuitants, and the Benevolent Fund Committee were requested to make the arrangements for the election on the 27th October next:—

1.—Froom, William Jacobs. Age 63. Member from 1842. In business in Exeter and Brighton, thirty-two years. Losses in business, arising from certain actions entered into by persons who had used a Sheep Dipping Composition sold by the Candidate (*vide* Pharm. Journal, vol. xi. pp. 283–292, 333); also ill-health. Two daughters, aged respectively 12 and 14 years, partially dependent upon him. Present means of subsistence derived from occasional employment as dispenser, but is chiefly dependent upon his elder children.

2.—Goldfinch, Charlotte. Age 59. Widow of late George Goldfinch, of Goswell Road, Member of the Society from 1853 to the time of his death, in 1855. Left with six children, and endeavoured, unsuccessfully, to continue her husband's business; has now one child dependent upon her. Is occasionally employed by a few friends.

3.—Novis, Thomas. Age 65. Member of the Society from 1841. In business in London sixteen years. Feeble health. Wife, aged 46, and two children, aged respectively 13 and 8 years, entirely dependent upon him. Present means of subsistence, about £25 per annum, arising from employment as collector.

4.—Peart, David.—Age 68. Member from 1842. In business in Ewell and elsewhere thirty-eight years. Wife, age 40, in ill-health, and two children, aged respectively 11 and 7 years, entirely dependent upon him. Has been engaged at the Epsom Literary Institution, at £20 per annum, for the last fifteen months, but is at present incapacitated by a rheumatic affection.

ORIGINAL AND EXTRACTED ARTICLES.

ON AN ANTIDOTE AT ONCE FOR PRUSSIC ACID, ANTIMONY, AND ARSENIC.

BY MESSRS. T. AND H. SMITH.

Notwithstanding the great number of years that have elapsed since the publication, in the 'Lancet,' of our paper containing an account of a method for counteracting the poisonous action of prussic acid when taken into the living stomach, and the favourable recognition it has received from the most eminent toxicologists, we are not aware of an instance in which it has had any application to the saving of life, except in a case which occurred in our own experience, when, by our prompt supply of the antidote, the life of a lady was no doubt saved. She had swallowed a solution of cyanide of potassium in mistake for a solution of muriate of morphia, both these solutions being in her bedroom, and properly labelled. No bad effects followèd the unfortunate mistake. Our experiments on dogs, detailed in our paper in the 'Lancet,' proved beyond a doubt that this antidote is complete and certain.

The dogs that got the poison without the antidote died. The dogs that got the antidote after the poison, lived and did well. In all cases, a much larger dose than a merely dangerous one was given, and no prussic acid could be recovered, by distillation, from the stomachs of the dead dogs. Cases of poisoning by prussic acid are frequent enough; but death takes place with such frightful rapidity, that this antidote is almost sure to be unattainable within the brief period in which it could be at all of any service; and that more especially, because the antidote requires to be expressly prepared; its being in readiness for a contingency which may never occur, not being likely, except with ourselves, and, perhaps, one or two others. While thinking over this matter, it has occurred to us, that in liquor ferri perchloridi of the British Pharmacopœia, a remedy may be found for the obstacles that have hitherto existed to the use of the prussic acid antidote. We proceed to show that the time taken to supply the antidote need not be greater than would be necessary to weigh out and measure two or three articles always at hand. The principle of the action of the antidote is exceedingly simple and easily understood; at least, if certain theoretical views be put aside, and the reaction with prussic acid be merely considered as a simple case of double decomposition, which results in the formation, in the stomach, of the harmless compound known as Prussian blue. The formula of Prussian blue is $2\,(Fe_2, Cy_3) + 3\,(Fe, Cy)$; showing that 7 equivalents of iron and 9 equivalents of cyanogen are contained in one equivalent of the compound. To produce this compound with the prussic acid there are required 7 equivalents of iron in the form of a soluble compound, of which four equivalents must be in the state of persalt, and 3 equivalents in the state of protosalt. The ready means of obtaining this solution are supplied in the liq. ferri perchloridi, and protosulphate of iron or green vitriol. It is easy to find the quantity of the perchloride solution, containing in grains, 4 equivalents of iron. 2 ounces, or 875 grains, are contained in 10 fluid ounces of the solution. Keeping now in mind that 4 equivalents of iron must be in the state of peroxide, or perchloride, which is equivalent; the quantity of perchloride solution required in the production of an equivalent of Prussian blue, may be found without any difficulty, thus:—

Grs. Iron.		Fl. oz. Sol.		4 eq. Iron		Fl. oz Sol.
875	:	10	: :	112	:	1·28, or 614 minims.

The 3 equivalents of iron in the form of protosalt, required for the formation of Prussian blue, are supplied as sulphate of protoxide of iron, the equivalent of which is 139; multiplying that number by 3, gives 417 grains.

It must be quite clear, therefore, that 614 minims of solution of perchloride of iron, and 417 grains of green vitriol, supply the iron in the form and quantity necessary for the production of Prussian blue; and as these ingredients contain, respectively, 6 equivalents of chlorine and 3 equivalents of sulphuric acid (which in Prussian blue are replaced by 9 equivalents of prussic acid), it is evident, as the equivalent of prussic acid is 27, that 9 times that sum is 243; 243 grains of prussic acid can, consequently, be destroyed by the above quantities; therefore, the hundredth of that quantity, or 2·4 grains (a good deal more than 100 minims of medicinal prussic acid), can be destroyed as a poison by 6·14 minims of solution of perchloride of iron, and 4·17 grains of green vitriol; but we need hardly say that prussic acid can take the place of neither hydrochloric nor sulphuric acid, unless, at the same time, an equivalent quantity of a strong base is supplied, to take the strong acid from the iron, the affinity of which is comparatively weak. Under such circumstances, the iron at once seizes on the prussic acid, and the desired result is obtained,—the formation of a harmless and stable compound. The effect is instantaneous.

The base that appears the most suitable for use with the antidote is carbonate of soda, or common washing soda,—but in clean crystals. This substance is very easily obtainable, is the most uniform in condition, and the least liable to adulteration. The quantity corresponding to the iron solution, in order to yield with prussic acid an equivalent of Prussian blue, is 9 equivalents, for there are 6 equivalents of hydrochloric acid, and 3 equivalents of sulphuric acid, which, therefore, in combining with the soda, gives 6 equivalents of chloride of sodium and 3 equivalents of sulphate of soda; and if there should have been a quantity of prussic acid in the stomach equal to 9 equivalents, the whole of the iron would have been converted into Prussian blue; but if the quantity of prussic acid should have been equal to $4\frac{1}{2}$ equivalents, or, say half that quantity, the half or the quarter of the iron would have been changed into Prussian blue, and the remainder into protosesquioxide of iron, a compound which may be taken inwardly without bad effects. The equivalent of crystallized carbonate of soda, not effloresced, is 143, nine times that quantity is 1287, and the hundredth part is consequently 12·87. The antidote for 2·4 grains anhydrous prussic acid, or upwards of 100 minims of medicinal prussic acid, is therefore theoretically 6·14 mins. liq. ferri perchloridi and 4·17 grs. green vitriol, mixed together in one solution, and another solution containing 12·87 grs. crystallized carbonate of soda. But we would recommend about six times these quantities for every 100 mins. medicinal prussic acid supposed to have been taken. We would therefore propose to attach to every bottle of sol. ferri perchloridi kept in stock by every druggist, a printed direction such as we append to this paper. For ourselves, we have already put into the printer's hands such directions.

The reason for so large an excess of the antidote to prussic acid being recommended is, that the carbonic acid interferes with the reaction, producing Prussian blue. The affinities of the carbonic and prussic acids for the soda are so nearly balanced that the reaction resulting in Prussian blue is not complete without the presence of a large excess of the iron and carbonated alkaline solution. The result would be very different with the use of a caustic alkali, but its corrosive action and less definite state preclude its use.

When poisoning has been caused by cyanide of potassium, in which the prussic acid is already united to a base, the alkaline solution forming one part of the antidote does not, of course, require to be given, although the antidotal action would not be prevented by giving it in the way recommended. The only result that would follow giving double the proper quantity of alkali would be the formation of yellow prussiate of soda and protosesquioxide of iron by the decomposing action of the carbonate of soda on the Prussian blue first formed. The yellow prussiate of an alkali is known to be a comparatively very inert substance.

The proof of what has been said is very easy. Take the quantity of a solution of protosesquisalt of iron, as given for the prussic acid antidote, then add the equivalent quantity of a solution of cyanide of potassium, in order to form Prussian blue. On now adding the quantity of solution of carbonate of soda corresponding to the iron solution, the Prussian blue, on brisk stirring, loses its colour for a greenish-black of protosesquioxide of iron, and, on now filtering, the filtrate reproduces Prussian blue on the addition of a persalt of iron.

The solution of perchloride of iron also supplies the means of obtaining instantaneously Bunsen's antidote for arsenious acid. When this idea first occurred to us, we intended to try in what time the hydrated peroxide could be thrown down, washed, and got into a state for exhibition to the patient; but on reflection, it appeared quite unnecessary to spend a moment's time more than would be required to measure out the quantity of solution of perchloride of iron, mix it with the alkali, and, after stirring, to give it at once to the patient.

We found that 80 grs. of peroxide of iron in the form of hydrate, obtained by precipitation with carbonate of soda, absorbed 10 grs. arsenious acid from solution. What in this case would have been the result, supposing this had been an actual case of poisoning with arsenious acid? 80 grs. of peroxide of iron, in the form of perchloride, would have required 3 equivalents, or 432 grs. of carbonate of soda. The result of the double decomposition between the perchloride of iron containing 3 equivalents of chlorine and the 3 equivalents of soda in the carbonate of soda, would have been 3 equivalents of chloride of sodium, or 175·5 grs., *i.e.* less than half an ounce of common salt, which, as an emetic, would actually have assisted the recovery of the patient, and therefore its exhibition along with the antidote could only have acted beneficially.

As we have found by innumerable trials that 80 grs., or 1 equivalent of peroxide of iron, absorbs 10 grs. of arsenious acid, it is necessary to find how much of the solution of the perchloride of iron is required to give that quantity. The calculation is easily made: 80 grs. peroxide of iron contain 56 grs. of iron, and as 10 fluid oz. of the solution contain 2 oz. or 875 grs. of metallic iron, the quantity required is given by the following proportions:— $875 : 10 :: 56 : x = 0{\cdot}64$. The quantity of the solution of perchloride of iron containing 56 grs. of metallic iron, or 80 grs. of peroxide, is therefore 0·64 oz., or $\frac{16}{25}$ of an oz., or exactly 5 fluid drachms and 7 minims.

The quantity being thus known, when the antidote is required, 307 minims of the solution are to be measured out, mixed with 1 or 2 ounces of water in a measure or beaker, and 1 ounce of crystallized carbonate of soda having been dissolved in about a couple of ounces of warm water, by rubbing up in a clean mortar, it is poured into the solution of iron, and the mixture stirred with a glass rod till the effervescence ceases; the pulpy hydrate is then ready for exhibition.

The moment the antidote has had time to mix with the contents of the stomach, it will have absorbed arsenious acid to the extent of 10 grs. Should more than that quantity have been taken, it becomes a question how much of the antidote may with safety be given, in the form recommended. It appears to us that a large quantity could be given with perfect safety. If the decision should be different, it would then be necessary to prepare the hydrated oxide of iron in the way recommended by Bunsen, and for the preparation of which there would be abundance of time, on account of the immediate effects of the poison having been effectually counteracted.

The solution of perchloride of iron is admirably adapted for the preparation of the hydrated peroxide. 10 fluid oz. give 1256 grs., or nearly 3 oz. of peroxide. Supposing 3 fluid oz. of the solution be taken to prepare the hydrate; pour this quantity into a convenient vessel for precipitation, a tall precipitating-glass would be best, add from five to ten times its bulk of pure water, then add liquor ammoniæ until, after brisk agitation, it smells distinctly of the volatile alkali; let the precipitate settle; pour off the clear liquid, and mix in a fresh quantity of water; let the precipitate settle a second time, then pour off the liquid as before; after repeating this operation several times, it may be considered sufficiently washed, but it may be better washed by now filtering, and if the hydrate has been thrown down from a warm and concentrated solution (which we have found does not prevent its antidotal action), the washing on the filter is not by any means tedious. The hydrate may easily be got ready for use in about an hour. The hydrate thus obtained is a most effectual antidote, and can be administered safely in almost any quantity.

When we turned our attention to this matter, we were in the belief that the hydrated oxide of iron would only act as an antidote to arsenious acid in the very pulpy state of hydrate, thrown down from very dilute cold solutions of peroxide of iron by ammonia, but we have found that it is of very little consequence, whether the oxide be thrown down from strong or weak, hot or cold solutions or whether by ammonia or a carbonated alkali; if, under any of these circumstances, the hydrate be used before being dried, it is almost equally effectual in absorbing the poison; if, however, the oxide should have been dried, it no longer acts; it does not appear to have the least power of removing arsenious acid from a liquid.

We have found, however, that 100 grs. of dry peroxide of iron, if subjected to most careful pulverization and elutriation, remove rather more than 2 grains of arsenious acid from solution.

The hydrate already prepared, and kept under water for some months, loses its absorbing action gradually (slowly at first, but in an increasing ratio afterwards), so that, after four months, its power is not more than half of what it originally was; and, after five, its absorptive action is diminished to about a fourth.

That we might be able to make a definite statement of the time in which the hydrated peroxide of iron could be precipitated, washed, and made ready for use, we threw down, with excess of ammonia, a quantity of the solution of perchloride of iron, containing 80 grs. of anhydrous peroxide of iron, after mixing it with ten ounces of water at a heat of about 120° F.

The precipitate settled quickly, but we did not wait for subsidence, so as to effect the washing by decantation, but at once threw the whole upon a filter, and washed the precipitate with pure water till the washing water passed through tasteless. The operation was finished in twenty minutes. The drained hydrated oxide was found to weigh exactly $4\frac{1}{2}$ oz. On now mixing, in a beaker, the hydrated oxide thus obtained with 10 grs. of arsenious acid in solution, carefully agitating for a few minutes, and then separating the liquid by filtration, sulphuretted hydrogen water added to the filtered liquid, acidulated with a few drops of muriatic acid, failed to show the presence of the slightest trace of arsenic. The whole operation was terminated within half an hour.

Three points worthy of special remark are brought out by this experiment:—

1st. The short time required for the preparation of the antidote, the solution of perchloride of iron being always ready at hand.

2nd. The remarkable bulk of the hydrated oxide of iron, in the only state in which it should be used as an antidote for arsenious acid. Although the hydrate used contained only 80 grs. of dry peroxide of iron; yet, in the state of hydrate, the weight was actually $4\frac{1}{2}$ oz. avoirdupois; the oxide of iron retaining a quantity of water equal to twenty-one times its own weight.

3rd. Although the oxide was thrown down at a heat not less than 110° F., yet it was capable of entirely removing 10 grs. of arsenious acid from solution in water.

We have stated that 80 grs. of peroxide of iron, in the form of hydrate, absorb 10 grs. of arsenious acid in solution; but we have found that, if time is given, its absorbing power is nearly doubled.

On mixing 10 grs. of arsenious acid, dissolved in water, with the properly prepared hydrate of 80 grs. of peroxide of iron, stirring briskly for a few minutes and filtering, not a trace of arsenious acid can be found in the filtered liquid. If the filter, with its contents, be now mixed with a solution of an additional 5 grs. of arsenious acid, and the liquid, after proper stirring, be filtered away, the presence of arsenious acid can be proved in it at once; but if the stirring has been continued for a long time, and twelve hours' contact allowed before filtration, it will be found that the liquid is free from arsenic. On now adding the solution of other 5 grs. of arsenious acid, giving the same care in stirring, and an equal time to the mixture for digestion, it will be found that the filtered liquid gives distinct traces of arsenic, but not more than, on comparison, is given by $\frac{1}{10}$ of a grain of arsenious acid in solution.

The practical inference that seems to be fairly deducible from the experiment here detailed is that, although the hydrated oxide of iron cannot quickly remove more arsenic than one-eighth of the weight of oxide of iron contained in it, yet it continues gradually acting to such an extent that, in the end, it can actually absorb nearly double that quantity.

There is a method of preparing the hydrated oxide of iron as antidote for arsenic, with caustic magnesia in place of either a fixed or volatile alkali; and, as thus prepared, its assimilating power on arsenious acid being complete, and its preparation easy and speedy, it will perhaps be considered by most toxicologists to be the best form of the antidote.

Measure off 307 minims of liquor ferri perchloridi into a glass, dilute with 3 or 4 oz. of water, then rub up, in a mortar, 90 grs. of calcined magnesia, into a cream, with about two ounces of water; this is at once added to the iron solution, and immediately briskly agitated with a glass rod. In about a minute the mixture, previously fluid, sets into a gelatinous mass of hydrate of peroxide of iron, with the production of a slight degree of heat, which on further stirring again becomes thin, and now consists of a mixture of 80 grs. of peroxide of iron, and 142·5 grs. of chloride of magnesium, with a small excess of magnesia. If the case does not contra-indicate the exhibition of chloride of magnesium, the antidote is ready for immediate use; but, if otherwise, it is very easily removed. To get quit of it add 3 or 4 ounces of water, mix and throw the whole upon a muslin or calico cloth laid into a basin, bring together the ends of the cloth, grasping them firmly in the left hand, and with the right press out the liquid steadily and moderately quick. After the liquid comes in drops, remove the mass from the cloth into a clean mortar, and then rub it into a smooth cream with a little water. The antidote is now ready for use, and is only contaminated with a quantity of chloride of magnesium, altogether insignificant. The whole operation can be easily finished in about five minutes.

If it should be considered necessary to get rid entirely of the chloride of magnesium, filtration can be adopted, and the mixed oxide of iron and magnesia washed till the washings come away tasteless. In consequence of the hydrate being mixed with magnesia, the filtration is very rapid.

It would be a great mistake to think that magnesia itself could act as an antidote to arsenious acid; any one can prove this for himself by the following experiment:—Dissolve a quantity of sulphate of magnesia sufficient to give 80 grs. of magnesia, precipitate with aqua potassæ, filter and wash thoroughly the pulpy hydrate of magnesia; mix now with the magnesia the solution of $2\frac{1}{2}$ grs. of arsenious acid, and, after thorough and continued agitation of the mixture, throw the whole on to a filter; the filtrate will give at once sulphuret of arsenic on acidulation with hydrochloric acid and addition of sulphuretted hydrogen. The same quantity of properly prepared peroxide of iron, in the form of hydrate, would almost at once have removed completely 10 grs. of arsenious acid from solution.

We here introduce a literal translation of Bunsen's original paper, as it has not, so far as we are aware, yet appeared in the 'Pharmaceutical Journal,' and because of its value and brevity.

"*Göttingen*, *May* 1, 1834.

"It is long since I have been led to the observation that a solution of arsenious acid is precipitated in a manner so complete by the hydrated peroxide of iron recently precipitated and suspended in water, that a current of sulphuretted hydrogen directed through the liquid, filtered and acidulated with a small quantity of hydrochloric acid, no longer presented the least trace of arsenious acid. I have also found that if to this body some drops of ammonia be added, and if it then be digested at a gentle heat with arsenious acid reduced to an impalpable powder, it transforms this last substance very quickly into a basic arsenite of peroxide of iron, which is altogether insoluble. A series of experiments, founded on this observation has produced in me the firm conviction that this body combines the most favourable conditions as an antidote against the poisonous action of arsenious acid, both in a solid state and in solution. Dr. Berthelot has very willingly, at my request, acted in concert with me in the examination of this subject under all its aspects, and in making it the object of more careful experiments.

"The results of this examination have gone much beyond our expectations, and have confirmed our persuasion that the hydrate of peroxide of iron is a better antidote for arsenious acid, both solid and dissolved, than albumen is for corrosive sublimate.

"Young dogs, less than a foot in height, to which we had given from 4 to 8 grains of arsenious acid reduced into fine powder (and after exhibition of the hydrate, a ligature having been applied to the œsophagus to prevent vomiting), lived more than a week, without presenting, either during life or on dissection, the slightest trace of arsenical poisoning.

"The excrements—which were, as might have been expected from the complete deprivation of both meat and drink, in very small quantity—contained almost the whole of the arsenious acid, in the form of basic arsenite of peroxide of iron, but contained not a trace of free arsenious acid. We have convinced ourselves, by experiments on animals, that a quantity of hydrate of $Fe_2 O_3$, answering to from 2 to 4 drachms of Fe_2O_3, mixed with 16 drops of ammonia, is sufficient to transform in the stomach 8 to 10 grs. of well powdered arsenious acid into insoluble basic arsenite.

"It is, besides, easy to see that we might, in cases of poisoning by arsenic, administer this body in proportions much more considerable, with or without ammonia, either by the mouth or by injection, since the hydrate of $Fe_2 O_3$, being a body altogether insoluble in water, exercises absolutely no action on the animal economy."

The ammonia above recommended by Bunsen can be of no use unless there should be acid in the stomach, and if this should be considerable, the small quantity of ammonia that could be given would go but a short way in neutralizing the free acid. It would, in our opinion, be better for the medical man to counteract the interfering action of the free acid by the liberal use of calcined magnesia, or a sufficient excess of the hydrated peroxide of iron. Should vomiting have occurred, the action of the vomited matter on test paper would be a useful guide to the medical man.

Although the absorbing power of the hydrated oxide upon arsenious acid is much lower than was found by us, it would be safest to fix the quantity to be used, in any case of poisoning by arsenic, on Bunsen's suggestion.* Soubeiran and Miquel found that dogs to which 12 grs. of white oxide of arsenic had been given died in about two hours, but other dogs that had got 18 grs. of arsenious acid along with twelve times that quantity of peroxide of iron in the state of hydrate, recovered completely. Vomiting was prevented in all cases by the application of a ligature to the œsophagus.

Soubeiran and Miquel have found that at the least twelve times the quantity of peroxide of iron in the form of hydrate is required to destroy the poisonous effects of one part of arsenious acid supposed to have been taken.

Dr. Brett's paper, in the fifteenth volume of the 'Medical Gazette,' containing a denial of the antidotal power of hydrated peroxide of iron on arsenic, is

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* One of the writers of this paper has reason to entertain grateful feelings in connection with Bunsen's antidote, as he probably owes his life to the prompt use of it, along with other means, after having, by an awkward mistake, swallowed a poisonous dose of Donovan's solution.

of no value; the experiments are altogether fallacious,—the conditions laid down by Bunsen having been so completely departed from, that he could have been told beforehand, by that *savant*, that the results of the experiments were nothing else than what were to have been anticipated.

For instance, 10 grs. of hydrated peroxide of iron were used along with 2 grs. of arsenious acid; whereas ten times the amount of the arsenious acid supposed to have been taken is the quantity of peroxide of iron, in the form of hydrate, declared by Bunsen to be necessary to remove the poison; and if by the 10 grs. are meant (for his meaning is not very clear) 10 grs. of peroxide of iron in the form of hydrate, in place of 10 grs., there should have been 20 grs., double the quantity used by Dr. Brett. If he used only 10 grs. of the hydrate (and weighed in that state), the quantity was actually between forty and fifty times too small.

His other experiments are equally fallacious, in either using ordinary oxide of iron, or the chemical compound of arsenite of iron, produced by double decomposition between an alkaline arsenite and a persalt of iron, neither of which had Bunsen ever stated to have any antidotal action. If the antidotal action of hydrated peroxide of iron depends on the formation of an insoluble arsenite, it must be an exceedingly basic compound, containing somewhere about 10 equivalents of Fe_2O_3 to 1 equivalent of As_2O_3. A compound of such a nature must have been obtained in the filter by Dr. Brett on washing the arsenite of iron, and continuing the washing till no more arsenic could be detected in the washing water. The oxide of iron after this operation still contained arsenic.

While engaged in these experiments on the antidotal action of hydrated oxide of iron on the poisonous effects of arsenic, the remarkable case of Dr. Pritchard had just occurred; and it at once occurred to us, that there was a great likelihood, principally from the many chemical relations of antimony to arsenic, that the hydrated oxide of iron might also be an antidote to the poisonous action of antimony.

A few experiments soon confirmed, in the fullest manner, our anticipations. A mixture of solution of perchloride of iron, containing 80 grs. of anhydrous peroxide of iron and a solution of 1 oz. avoirdupois of crystallized carbonate of soda, was prepared; to this mixture, containing hydrated peroxide of iron and chloride of sodium, was added a solution of 10 grs. of tartar emetic: the whole was thoroughly agitated, and thrown on a filter. The filtered liquid, acidulated with muriatic acid, was tested with sulphuretted hydrogen for antimony, but not a trace was found. The filter, with its contents, was then mixed with other 10 grs. of tartar emetic, which were again removed by the oxide of iron. A third quantity of tartar emetic added was almost entirely removed, so that 80 grs. of hydrated peroxide of iron absorb nearly 30 grs. of tartar emetic from solution.

The absorbing action of hydrated oxide of iron towards antimony would be still more striking but for the dissolving power of the tartaric acid, set free, upon the peroxide of iron. That the oxide of iron does not merely act by taking the organic acid and precipitating the oxide of antimony in an insoluble state, is shown by using hydrate of magnesia instead. In this case, even with a much smaller quantity of tartar emetic, the filtered liquid gives antimony in abundance to the proper tests.

To be suitable for the antidotes, the liquor ferri perchloridi must answer to the following tests:—one fluid drachm must contain 15·62 grains peroxide of iron, ammonia must give a pure reddish-brown precipitate, without any shade of black; it must not smell strongly acid, nor, after slight dilution, give a brisk effervescence with a piece of zinc.

Directions proposed to be attached to each bottle of Liq. Ferri Perchloridi:—

Prussic acid antidote.—Take of liquor of perchloride of iron 37 minims, protosulphate of iron in crystals, as pure as possible, 25 grs.; as much water as make a solution of a protosesquisalt of iron, measuring about half an ounce. Dissolve, on the other hand, 77 grs. crystallized carbonate of soda in about half an ounce of water. These quantities destroy the poisonous action of between 100 and 200 minims of medicinal prussic acid, officinal strength, on giving first the one liquid and then the other.

Antidote for cyanide of potassium.—The antidote for this compound is the same as for prussic acid, except that the solution of protosesquisalt of iron is to be used without the alkaline solution, the prussic acid being already combined with an alkali; the use of the alkali, however, would not be injurious; a harmless yellow prussiate would be formed. In this case, in consequence of the possible presence of free acid in the stomach, the alkaline liquid should be given first,—the quantities given, as the prussic acid antidote would decompose 35 grains of cyanide of potassium.

Antidote for arsenious acid.—Measure out 5 fluid drachms and 7 minims of liquor ferri perchloridi into 2 or 3 oz. of water, then add to the liquid a solution of 1 oz. of crystallized carbonateof soda in a few ounces of warm water, stir till effervescence ceases; the resulting mixture destroys about 10 grs. of arsenious acid.

Antidote for tartar emetic.—Mix 5 fluid drachms and 7 minims of liquor ferri perchloridi with a few ounces of water; mix in now a cream formed of 90 grs. of calcined magnesia, rubbed up with water in a mortar, stir till, after gelatinizing, the mixture again gets thin; empty the mixture into a calico or muslin cloth, and press out the liquid; remove the mass from the cloth into a clean mortar, and rub it up with a little water into a smooth cream; in this state it can destroy upwards of 20 grs. of tartar emetic. It may also be used as an antidote for arsenious acid, of which it absorbs about 10 grs.

An important addition to this paper will appear in the next Journal.

PHARMACY AT THE DUBLIN EXHIBITION.

BY HARRY NAPIER DRAPER.

(*Continued from p.* 107.)

COLONIAL POSSESSIONS.—The general collection from the BAHAMAS, which consists principally of indigenous woods, including a few things of pharmaceutical interest, as *Cascarilla Bark, Wild Cinnamon,* and *Ambergris. Myrtle Wax* from the berries of *Myrica cerifera* is also shown; this wax is remarkable for its *green* colour, which would appear to be due to the presence of chlorophyll. The *Myrica cerifera* is said by Richard to be abundant in the United States. The berries are covered with a waxy coating of shining whiteness, and on being boiled with water, yield about one-fourth of their weight of the wax. The green colouring matter is removed by ether. The authority already quoted, observes that the *Myrica* thrives well in the climate of Paris, and that the extension of its culture would be very desirable.

CANADA sends maple sugar, a few gums of no great interest, fine specimens of plumbago and other useful minerals, among which the most notable is *Apatite,* said to contain 90 per cent. of phosphate of lime, and which is of course very valuable as a source of phosphoric acid for manure.

The collection from the FALKLAND ISLANDS includes specimens of *Penguin Oil,* both crude and refined. This is, I suppose, used by curriers, as its very repulsive taste and fishy smell would quite unfit it for burning or for being a substitute for cod-liver oil, which it somewhat resembles in general character.

The Secretary of State for India has sent to the Exhibition a most comprehensive collection, illustrating the mineral vegetable and animal products of the country. This case is one of the most interesting in the colonial department, and its contents are well worthy of study. The collection of seeds producing fixed oils and of the oils themselves is particularly complete and instructive. The oils are placed in tubes of clear glass, which are enclosed in the boxes comtaining the seeds, so that each seed is placed in juxtaposition with the oil which it furnishes. Thus we have *Linseed* from Bombay, Bengal, and Mirzapore, *Rape* from different provinces, *Mustard, Sesame, Ben (Moringa pterygosperma), Poppy, Safflower, Ramtil* (this, the seed of *Guizotia oleifera* is apparently what is known in English commerce as "Niger seed"), *Cucumber, Ground nut (Arachis hypogea), Pumay (Caulophyllum inophyllum),* and *Poonga (Pongamia glabra).* Among the *fats* or solid oils are "*Vegetable Wax from Castor Oil,*" (a product about which it would be desirable to learn something), *Kokum Butter* (*Garcinia purpurea*), and *Illoopie* and *Mowha* oils, the products respectively of two species of *Bassia latifolia* and *longifolia.* There is also a specimen of *Pinay Tallow* (*Vateria Indica*). I do not know whether this specimen is in the solid state or not; if it be, it is remarkably transparent and looks more like very fine resin than a fat. Pinay tallow is, however, said by Babington to fuse at 97° F., and as the temperature in the Exhibition building cannot now be far short of this, I do not feel very certain about it. The fat certainly is worthy of being examined; Muspratt says, that candles made with it do not evolve acrid vapours when extinguished. Perhaps we may look here for a new glycerine.

Specimen of *Cashew Nuts (Anacardium occidentale), Marking Nuts (Semecarpus Anacardium),* and *Soap Berries (Sapindus emarginatus)* are also shown. In the collection of spices, a few products are shown which are novel, as for example *Tejpat Leaves,* the produce of a *Cinnamomum,* and a few others which are scarcely classed under this head in Europe, as *Mint Leaves* and *Cubebs.*

The *Materia-Medica* collection is very extensive, and besides containing specimens of all the Indian drugs known to British Pharmacy, includes a vast number of others which are unknown even by name in this country.

In the collection sent by Mr. Simmonds to represent the products from Lagos, are *Egusé* and *Tallicoonah Oils, Bene Oil,* and *Ground-nut Oil (Arachis hypogea).*

In the very fine general collection from the Mauritius, *Vanilla* is, of course, conspicuous. Some of the specimens are particularly beautiful, and nearly all are covered with the efflorescence of the active principle *vanillin,* or are, as the French say, *givrée.* The strictly pharmaceutical part of the Mauritius collection is, however, included in a small case sent by Dr. Louis Bouton, and which contains a number of medicinal plants indigenous to the island.. These are not very well shown, being indeed wrapped in parcels, and packed tightly into the case. Dr. Bouton has, however, sent a number of copies of his work, 'Plantes Médicinales de Maurice,' which I can recommend to any of my readers who may be interested in the subject as a most compendious and clearly written book. Dr. Bouton has arranged the plants under their Natural Orders, and the plan of description is very much to be commended. He gives the *generic name* and its etymological origin, the *specific name,* the *habitat,* and the *distinctive characters;* then the *local name,* and its English, French, and Indian synonyms. It must be understood that the book is not merely made up of so many pages of dry botanical description, but contains a vast amount of useful and interesting information on the properties of plants, with which we are at home either in total ignorance, or about which we have very imperfect knowledge.

VICTORIA sends, among a collection of products which appear to typify almost the entire natural resources of this important colony, a great many things connected with pharmacy. In noticing the most interesting of these, I have much pleasure in bearing testimony to the courtesy of the gentleman to whose charge they have been entrusted, and who has been at considerable pains to afford me the information which I required, and to facilitate my examination of the specimens. I make no invidious distinction, when I say that that comparatively small section of the public, which, in visiting the Exhibition, troubles itself about the minute examination of the contents of the glass-cases, would be much benefited by the at least occasional attendance of exhibitors, or their delegates, in the Foreign Courts.

Mr. J. Bosisto, Melbourne, sends some specimens of essential oils, which are quite new to this country. That of *Amygdalina odorata* is said to be sent to London, and used in perfumery. Oil of the *bark* of *Atherosperma moschata* is stated to be used in the colonial hospitals as a diaphoretic, diuretic, and sedative, and "appears to exercise a specific lowering influence on the action of the heart." The dose in which it is administered is from one to two drops at intervals of six or eight hours. The oil of the *leaves* of the same plant possessed similar properties, but in a less degree. Essential oil of *Melaleuca ericifolia* ("Australian Cajuput"): the note referring to this oil, in Mr. Bosisto's circular, states, that it is "equal in effect to the oil of *Melaleuca leucadendron.*" I have not yet had time to devote to any detailed examination of these oils, of which samples have been very kindly placed at my disposal, but they are *all* wonderfully alike in odour and general character. It is, however, just possible that one or two of them may find an application as perfumes for soap, and the Cajuput oil deserves to be made the subject of experiment.

Mr. Boardman, of Nunawading, also sends a collection of essential oils, which includes some of those already mentioned, and in addition oil of *Eucalyptus corymbosa,* oil of caraway, and oil of peppermint. This last is far superior in quality to the finest American oil I have ever seen, and might fairly be put into competition with English; the price is 40*s.* per lb. The Victorian catalogue gives also some other prices; that of the oil of *Eucalyptus amygdalina* is 3*s.* per lb.; of *Eucalyptus corymbosa,* 6*s.*; the oil of Melaleuca, 20*s.* The latter at this price is not likely to supersede genuine Cajuput oil.

Some interesting *Gums* are also exhibited in the Victorian department. Those from *Eucalyptus odorata* and *fabrorum* are stated to be soluble in water, and applicable for tanning purposes. *Gum Eucalyptus rostrata* (red gum) is astringent, and recommended as a substitute for kino. A notice of this gum appeared some years ago in the Journal, and it is, I see, now advertised as "gumma rubra." Chevallier says that it is inferior to kino in medicinal value. The resin of *Xanthorrœa australis* is soluble in spirit, "leaves a bright red polish on wood, when used as French polish; contains cinnamic and benzoic acids." The action of concentrated nitric acid on this gum gives rise, as is well known, to picric acid.

Among other specimens shown are balsam of *Amygdalina odorata* (by distilling the leaves), berries of *Drimys aromatica,* or "Australian Pepper," leaves of *Senecio Bedfordii,* the under surface of which is covered with a thick white down, the use of which as a paper material is suggested. One pound of leaves gives about an ounce of this white flock. The other specimens are *Wattle Galls,* resin of *Callitris verrucosa,* bark of *Atherosperma moschata,* and very good native-grown *Rose leaves.* Hood and Co., Melbourne, send a very good collection of chemical products, among which there is of course nothing novel, but many of them will bear comparison with the best preparations of English manufacture.

Foreign States.—From Austria are sent *Wax*, both bleached and unbleached; the former is cut or shaved in small pieces, with the view of increasing its apparent whiteness, so that it is impossible to compare it fairly with the bleached wax of home production. R. Loehnert (Bohemia) has a good collection of dextrines, "gum substitutes;" and other modifications of torrefied starch.

Belgium.—Bruneel and Co. (Ghent) have a good series of products from the destructive distillation of wood. De Cartier (Anderghem), *Iron Minium*, obtained by calcining red hæmatite and levigating the product. The "iron minium" is said to be in many respects a better paint than either red lead or oxide of iron, prepared from the sulphate. Blondiau (Alost) sends *Glucose*, a substance which is now prepared in vast quantities from farina, and finds a ready sale in this country, being probably used as a source of alcohol.

France.—MM. Baudesson and Houzeau (Reims) furnish to the Exhibition an extensive series ef chemical products and specimens of "photography on tissues," concerning which latter no information has been afforded.

E. Dubosc and Co. (Havre) contribute specimens of liquid and solid extracts of dye-woods. Of these I have examined those of *Logwood* and *Persian Berries*, which are of very good quality, and are nearly totally soluble in cold water. The other French exhibitors of chemical products are MM. Tissier (Conquet), Roques and Bourgeois (Ivry), and Odeph (Luxeuil). The last-named shows *Extract of Pomegranate*, a preparation which, by the way, might very advantageously be introduced into English pharmacy. The value of pomegranate bark as an astringent in diarrhœa, although popularly appreciated, is not sufficiently recognized by physicians.

Italy.—In this department there are of course several exhibitors of *Sulphur*, of which many of the specimens are in very fine crystals. The chief contributors of sulphur are S. Barbagallo (Catania), the Duke of Brolo (Palermo), and the proprietors of the Romagna Sulphur Mines (Bologna). Oils of *Lemon*, *Orange*, and *Orange Flower*, and of *Bergamot*, are sent by the firms of Mellisari (Reggio) and Antonnio (Catania). *Citric Acid*, not very remarkable for whiteness, is shown by A. Campisi (Catania). A very extensive series of chemical products, presenting, however, nothing very remarkable, is contributed by Candiani and Co. (Milan). It includes, however, *Borate of Manganese*, used in the preparation of drying-oil, and said to be far more effective for this purpose than oxide of lead.

Dr. Bandiera (Palermo) sends a styptic fluid, which, under the title of *Hæmostatic Water*, is said to be very effective in controlling hæmorrhage. This is, I presume, a solution of the double chloride of sodium and peroxide of iron, which was described by, I think, Dr. Phipson, in the 'Chemical News,' some time since.

A very interesting series of specimens is contributed by the Convent of Servite Friars (Sienna). The monks appear to turn to good account the carbonic acid evolved from the mineral springs of Chianciano, and manufacture by its aid very good *Bicarbonate of Potash* and *Bicarbonate of Soda*. They make also "*Protocarbonate of Iron*" by double decomposition of the sulphate and an alkaline carbonate, and then drying the product in an atmosphere of carbonic acid. I had hoped that the carbonate thus obtained might really be something more than sesquioxide, and that the Serrite Friars might be able to supply English pharmaceutists with a product which we have no opportunity of preparing for ourselves, but I was not a little disappointed to find, on examining the "protocarbonate," that it contained but a trace of carbonic acid, and was little, if at all, more deserving of the name than the oxide of our own Pharmacopœia.

The other specimens of interest in the Italian department are those of

Mannite, obtained from the leaves, flowers, and fruit of the olive in various stages of development, sent by Professor Di Luca, who has thoroughly worked out the whole subject of the formation of this sugar in different parts of the tree. *Asparagine*, *Caffeine*, and *Citrate of Caffeine* are sent by P. Galgano (Sienna).

In the JAPANESE collection are one or two rolling blinds, made of the mysterious "rice-glass," about which there was so much discussion at the time of the London Exhibition of 1862. As they hang here, however, the only senses which one can bring to bear upon any attempt at unravelling the supposed secret of the composition of this glass, can discover in it nothing which in any way distinguishes it from the ordinary glass of our own country.

SIAM—or rather Mr. Simmonds, who appears to represent all the out-of-the way countries in the world at the Exhibition—sends some curious things. *Wood Oil*, seeds of *Nelumbium speciosum* (made into flour, currie powder, and eaten like chestnuts), *Bastard Cardamoms*, *Sipziet*, and *Pun*,—both *desiderata* to the full enjoyment of betel, the *Pun* being *lime*, coloured pink by turmeric and *Luet nangret*, the coagulated blood of the rhinoceros, used in medicine.

From *Switzerland* we might, of course, expect to receive good samples of *sugar of milk*, and those sent by the Brothers Lotscher (Marbach) are very good indeed; but one could have scarcely hoped to have found among the contributions from this country so magnificent a collection of chemical products as those in the neat case which bears the name of Henner and Co. (Wyl). A chemist, without even being at all enthusiastic, might spend an hour before this case in contemplating products which are rarely seen out of the laboratory of research; the pharmaceutist will find in it specimens of salts with which he is indeed familiar, but which in the new beauty which they borrow from perfect crystallization and absolute purity almost assume a new character. The photographer will recognize the compounds with which he is accustomed to manipulate, but he can scarcely hope to procure such chemicals through the ordinary channels. The price-list of MM. Henner lies before me, and, although there is a novel sensation experienced in seeing such names as *kakodyle, chinovinic acid, selenic acid, amygdalin, diastase, saponin*, and *mercaptan*, placed in parallel columns with vulgar francs and centimes, yet I must refrain from quoting further from its contents. MM. Henner have certainly brought together the most beautiful collection of *produits chimiques* which it has ever been my lot to inspect. If, however, it is at all approached in the Exhibition, it is by the wonderful series of metallic salts shown in the *Zollverein* department by Dr. Schuchardt, of Muskau, in Silesia. This consists of a systematically arranged series of compounds of the metals *cobalt, manganese, nickel, iron, copper, zinc, cadmium, copper, tin, uranium, lead, antimony*, and *bismuth*. I may just take the cobalt series as an example, in order to show the completeness of the collection and give some idea of its value. Of cobalt there are shown *oxide, arseniate, nitrate, phosphate, silicate, chloride, sulphate, acetate, borate, chromate, carbonate*, and *oxalate*. The series of compounds of each of the other metals named is nearly as exhaustive. There are besides two bottles, containing perhaps more *vanadiate of ammonium* and *vanadiate of sodium* than perhaps exists in all the laboratories in Europe.

I understand that a well-known London firm has purchased the entire of this valuable collection.

Remme and Friedmann (Berlin) have a pretty large collection of essential oils, and of flavouring essences, and compound ethers. Many of the latter are used in Germany for giving distinctive character to the numerous varieties of ardent spirits, of which our Teuton neighbours are so fond. We have thus:—*Berlin Bitter Oil,* "*Corn Brandy Cummin Oil,*" *Dantzic Goldwasser Oil,* and *Spanish Bitter Oil.* The compound ethers are applied to the same purposes for which they are used in England, that is, to counterfeit, with more or less success, the natural flavours of wines and other alcoholic beverages. They consist, as regards the specimens in Messrs. Remme's collection, of organic ethers and aldehydes combined with essential oils. These shown are essences of arrack, brandy, rum, sherry, and "muscat lunel." The last apparently consists of acetic ether and oil of neroli. The rum essence is, as far as I can analyse it by smell, aldehyde and creasote; the brandy essence, pelargonic and acetic ethers with vanilla.

Cigars "impregnated with iodine," are shown by Eckert (Frankfort-o.-M.).

I think I have now noticed all the products in the Dublin International Exhibition, which appear to me likely to interest the readers of the journal, or to merit record in its pages. I have only, as I bring my report to a conclusion, to thank those who have so kindly afforded me information, and to express my obligations to the exhibitors and their agents for the uniform courtesy and often painstaking attention which I have received at their hands.

PHARAOH'S SERPENTS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—A very curious toy is now being sold in Paris, under the name of Pharaoh's Serpent. As this toy really constitutes an interesting chemical experiment, perhaps an account of it may prove interesting to your readers.

It consists of a little cone of tinfoil, containing a white powder, about an inch in height and resembling a pastille. This cone is to be lighted at its apex, when there immediately begins issuing from it a thick serpent-like coil, which continues twisting and increasing in length to an almost incredible extent. The quantity of matter thus produced is truly marvellous, especially as the coil which so exudes is solid and may be handled, although, of course, it is extremely light and somewhat fragile.

Having a little of the white powder, with which the cones are filled, placed at my disposal by a friend, I submitted it to analysis and found it to consist of sulphocyanide of mercury. This salt, when heated to a temperature below redness, undergoes decomposition, swelling or growing in size in a most remarkable manner, and producing a mixture of *mellon* (a compound of carbon and nitrogen) with a little sulphide of mercury. The resulting mass often assumes a most fantastic shape, and is sufficiently coherent to retain its form; it presents a yellow colour on the exterior, but is black within. The "serpent" shape of course results from the salt being burnt in a cone of tinfoil.

Both the mercurous and mercuric sulphocyanides decompose in the same manner; but the mercuric salt, containing more sulphocyanogen, seems capable of furnishing a larger quantity of mellon, and is the one used in the French serpents. A solution of pernitrate of mercury is readily precipitated by sulphocyanide of ammonium, and the mercuric sulphocyanide may be easily so prepared. It is best to use the mercurial solution as strong as possible, and to *keep it in excess* throughout the precipitation. Solution of perchloride of mercury is not so easily precipitated as the pernitrate, probably owing to the solubility of the mercuric sulphocyanide in the chlorides.

Perhaps I may be excused for adding that sulphocyanide of ammonium, suitable for the above purpose, may be very easily and economically prepared, as follows:—One volume of bisulphide of carbon, four volumes of liq. ammon. fort., and four volumes of methylated spirit are put into a large bottle, and the mixture frequently shaken. In the course of one or two hours the sulphide of carbon will have entirely dissolved in the ammoniacal liquid, forming a deep red solution. When this result is attained, the liquid is boiled until the red colour disappears and is replaced by light yellow. The solution is then evaporated at a *very gentle heat* (about 80° or 90° F.) until it crystallizes, or just to dryness. The product is sulphocyanide of Ammonium, sufficiently pure for the above purpose. One recrystallization from alcohol will render it quite white.

One ounce of bisulphide of carbon yields, by this process, exactly one ounce of sulphocyanide of ammonium. I am, etc.,

C. H. Wood, F.C.S.

BRITISH PHARMACEUTICAL CONFERENCE.

MEETING AT BIRMINGHAM, 1865.

The first sitting of the Conference was held on Tuesday, September 5, 1865, at the Odd Fellows' Hall, Birmingham, at 10 A.M.; the President, H. Deane, F.L.S., in the chair.

The members present at this and at subsequent sittings included H. Deane, F.L.S.; W. E. Heathfield, F.R.G.S.; H. Matthews, F.C.S.; J. C. Brough; J. Wade; J. Watts; — Bass, and Dr. Attfield, F.C.S.,—of London: H. B. Brady, F.L.S., of Newcastle-on-Tyne: R. Reynolds, F.C.S., of Leeds: J. C. Pooley, of Bath: G. F. Schacht, of Clifton: J. S. F. Richardson, of Leicester: W. Y. Brevitt, of Wolverhampton: J. H. Atherton; R. Fitzhugh; J. Rayner; and W. H. Parker,—of Nottingham: Dr. Parkinson, of Bradford: J. Leay, of Chilcompton: G. U. Jones; H. Davies; and E. Caswell,—of Leamington: R. G. Jones, of Lye, Stourbridge: J. Tuck, of Wilton: E. Hollier, of Dudley: W. W. Stoddart, of Bristol: W. Hearder, of Torquay: T. B. Groves, of Weymouth: S. R. Atkins, of Salisbury: Dr. J. B. Edwards, F.C.S.; and H. S. Evans,—of Liverpool: Prof. J. G. Barford, M.R.C.S., of Wokingham: C. L. Metcalfe, of Hull: W. D. Savage, of Brighton: and Messrs. J. Churchill, J. Churchill jun., J. Woolley, E. Snape, G. Dymond, C. J. Arblaster, H. Whittles, S. Grieves, G. Thonger, T. Barclay, T. W. Holdsworth, A. Southall, J. Lucas, J. Price, T. J. Musson, C. F. Palmer, and about ten other gentlemen of Birmingham and the neighbourhood, whose names could not be ascertained. Among the visitors were Dr. De Vry, Prof. Archer, Mr. Bremridge, Drs. Fleming, Hill, Warden, Solomon, Miller, and Hinds; and Messrs. A. M. Chance, F. Selby, M.R.C.S., Langston Parker, M.R.C.S., and H. Davis, M.R.C.S. Letters expressive of regret at absence were read from Mr. G. W. Sandford; Prof. Bentley; Mr. Giles, of Clifton; Mr. Mackay, of Edinburgh; D. Hanbury, F.L.S.; J. Sutton, F.C.S.; and Mr. J. C. Braithwaite.

Delegates from the Chemists' Associations of Liverpool, Leeds, and Bath, attended the meeting; Mr. Atherton and the gentlemen from Nottingham and the delegates from Liverpool bringing invitations to the Conference to meet in their towns in the year 1866.

The following gentlemen were balloted for and duly elected members of the Conference.—

Agar, Mr. W., Mansfield.
Alldridge, Mr. W., 39, Summer Lane, Birmingham.
Allport, Mr., Snow Hill, Birmingham.
Arblaster, Mr. C. J., New Street, Birmingham.
Atkins, Mr. S. R., Market Place, Salisbury.
Atkins, Mr. W. S., Broad Street, Birmingham.
Barnitt, Mr. J., 30, Upper Parade, Leamington.
Bass, Mr., Hatton Garden, London.
Bass, Mr. C., Nottingham.
Berridge, Mr. A., Leicester.

Bird, Mr. A., Worcester Street, Birmingham.
Bland, Mr. J. H., 75, High Street, Stourbridge.
Boor, Mr. G., Brownswood Park, Hornsey.
Buzzard, Mr., Leicester.
Carter, Mr. W., Cheetham Hill, Manchester.
Caswell, Mr. E., 37, Regent Street, Leamington.
Cawdell, Mr. G., 12, London Street, Hyde Park.
Chick, Mr. W., Fisherton, Salisbury.
Clark, Mr. J. W., Leicester.
Colbeck, Mr., 23, Lower Parade, Leamington.
Cooper, Mr. T., Leicester.
Daves, Mr. E., Torquay.
Davis, Mr. H., 19, Warwick Street, Leamington.
Dudley, Mr. J., Worcester Street, Wolverhampton.
Dunmore, Mr. J., Small Heath, Birmingham.
Evans, Mr. E. P., Cleobury-Mortimer.
Evans, Mr. R., 300, New John Street West, Birmingham.
Fitzhugh, Mr. R., Nottingham.
Frost, Mr. G., 7, Corn Market, Derby.
Goddard, Mr. J., Leicester.
Goodall, Mr. H., Derby.
Gordelier, Mr. P. W. G., Sittingbourne, Kent.
Gray, Mr. J., Islington, Birmingham.
Green, Mr. J., West Bromwich.
Grieves, Mr. J. E., Ludlow, Salop.
Hamp, Mr. J., Worcester Street, Wolverhampton.
Hampson, Mr. R., Alderley Edge, Manchester.
Harper, Mr. H., 118, Warwick Street, Leamington.
Harris, Mr. J., Evesham Street, Redditch.
Hayward, Mr. C., Lincoln.
Hayward, Mr. W. H., Trowbridge, Wilts.
Hedges, Mr. W. R., Dale End, Birmingham.
Hick, Mr. J., Broadstairs, Bradford.
Higginson, Mr. J., Gallowtree Gate, Leicester.
Hinds, Mr. J., Coventry.
Hopkinson, Mr. T., Grantham.
Humphries, Mr. C., Walsall.
Jenkins, Mr. J., Nottingham.
Jenkins, Mr. J. T., Denman Street, New Radford, Nottingham.
Jones, Mr. R. G., Lye, Stourbridge.
Jones, Mr. T., F.R.A.S., 13, Dundas Terrace, Brookhill Road, Plumstead, S.E.
Jones, Mr. W. J., Jamaica Row, Birmingham.
Kearnes, Mr. R. H., Swan Bank, Bilston.
Keene, Mr. A., 115, Warwick Street, Leamington.
King, Mr. H., 1, Churton Street, Pimlico, London.
Lansdale, Mr. C., Trowbridge, Wilts.
Litchfield, Mr. S., 60, Lancaster Street, Birmingham.
Loane, Mr. J., Dock Street, Leman Street, London, E.
Lucas, Mr. J., 4, Colmore Row, Birmingham.
Mason, Mr. R. C., Great Colmore Street, Birmingham.
Mayfield, Mr. J. I., 96, Darlington Street, Wolverhampton.
Meadows, Mr. J., Humberstone Gate, Leicester.
Merry, Mr., Ilkeston, near Nottingham.
Merryweather, Mr. C., Leicester.
Mogridge, Mr. E., Torwood Place, Torquay.
Morris, Mr., Bristol Street, Birmingham.
Musson, Mr. T. J., Highgate, Birmingham.
Nock, Mr. J., Cradley Heath.
Packwood, Mr. C., 14, Sumner Lane, Birmingham.
Palmer, Mr. C. F., Colmore Row, Birmingham.
Parsons, Mr. F., Leicester.
Potter, Mr. J., 26, Dudley Grove, London, W.
Price, Mr. J., Bromsgrove Street, Birmingham.
Pullin, Mr. W. H., Atherstone.
Rayner, Mr. J., Long Row, Nottingham.
Read, Mr. W., Epworth, near Bawtry.
Roberts, Mr. G., West Bromwich.
Salisbury, Mr., Leicester.
Slugg, Mr. J. T., 214, Stretford Road, Manchester.
Smith, Mr. A., Ann Street, Birmingham.
Smith, Mr., 3, Lower Parade, Leamington.
Stanley, Mr. J., 10, Upper Parade, Leamington.
Steele, Mr. E. B., Park Lane, Leeds.
Steward, Mr. J., Kidderminster.
Steward, Mr. J., Brierley Hill, Stourbridge.
Thonger, Mr. G., Islington, Birmingham.
Tomlinson, Mr., Bristol Road, Birmingham.
Toone, Mr. J. H., Granby Street, Leicester.
Topp, Mr. J., Small Brook Street, Birmingham.
Uppleby, Mr. H., 6, Victoria Terrace, Leamington.
Verge, Prof. C., M.D., Leval University, Quebec.
Walton, Mr. B. B., Lichfield.
Waterall, Mr. G. E., Nottingham.

Waterson, Mr. J., Mosley Road, Birmingham.
Welch, Mr. C., Long Row, Nottingham.
West, Mr. J., Torquay.
White, Mr. F., London Road, Nottingham.
Williams, Mr. C. J., St. John's, Warwick.
Williams, Mr. J., 20, Regent Street, Leamington.
Williams, Mr. W. P., Long Row, Nottingham.
Wilshaw, Mr. J., Wordsley.
Witherington, Mr. T., 7, Foregate Street, Worcester.
Wood, Mr. E. B., Holloway Head, Birmingham.
Woodward, Mr. W., Nottingham.
Wright, Mr. G., Congreve Street, Birmingham.
Yewdall, Mr. E., Wade Lane, Leeds.
Young, Mr. W. F., High Street, Salisbury.

The following Report was then read by Dr. Attfield:—

"REPORT OF THE EXECUTIVE COMMITTEE.

"During the interval between the last and present annual meeting, the duties of your Committee have been few and formal.

"The proceedings of the Conference at Bath were fully reported, by the kind permission of the Council of the Pharmaceutical Society, in the 'Pharmaceutical Journal' of October and November, 1864, the papers being printed verbatim, and the discussions in abstract. A reprint of that Report, to which was appended a statement of the objects, etc., of the Conference, the list of officers for 1864–5, a table of contents, and a list of members, the whole included in a neat paper wrapper, was sent to every member of the Conference as soon after the meeting as possible; the volume will, however, this year be issued earlier. A few copies of the "Proceedings" were sent to eminent scientific men and societies of Great Britain, America, Germany, and France.

"Since the last meeting about fifty names have been added to the list of members. It is gratifying to add, that in addition to these, the ranks of the Conference has been swelled at the present meeting by the enrolment of one hundred and six gentlemen. Thus has our strength more than doubled during the second year of our existence, the exact number of members being now three hundred and five.

"Early in January of the present year, your Committee issued to every member a list of questions for research, accompanied by a request that some one or more of the subjects should be worked out and reported. The result is that thirty papers have been sent in, and will be read at the present and subsequent sittings. They will doubtless prove of equal value with those of last year, many of which, it is pleasing to notice, were copied into the scientific journals of Europe and America. In order to give an impetus to the investigation of subjects relating to adulterations, impurities, and faults of manufacture, your Committee, seven months ago, issued a circular to members, requesting that specimens of commercial drugs and chemicals might be sent to the secretaries, for distribution to gentlemen willing to analyse the samples of any given preparation, and report the analysis to the annual meeting. The result is, that you will have the opportunity of listening to some interesting papers of this class. But the value and importance of the work might be greatly extended if a larger proportion of members would contribute specimens. The collection of samples from his own or other stocks is an easy matter for any member, but the Committee would especially urge this point on the attention of members who have not time or opportunity to make researches. The names of vendor or maker need not be divulged by the collector, provided each specimen is distinguished by a lettered or numbered label, stating only the name of the preparation.

"In conclusion, your Committee sees no reason to deviate from those methods of accomplishing the objects of the Conference which were proposed when this Association for the advancement of pharmacy was established, and which have hitherto been attended by such satisfactory success. There is work for every member to do; for those who have much time there are subjects to investigate, those who have less may aid in maintaining the principle of purity in medicine in the manner just indicated; while all may be able to propose subjects for investigation, and lastly promote both the scientific and social interests of the chemist and druggist by attending the annual meetings."

The financial position of the Conference was then laid before the meeting.

The Treasurer in Account with the British Pharmaceutical Conference, 1864–5.

Dr.	£	s.	d.
To Cash in hand, August, 1864	10	12	8
,, 117 Subscriptions— 12 for 1863–4, 62 for 1864–5, 43 for 1865–6	29	5	0
,, Sale of Proceedings	0	5	0
	£40	2	8

Cr.		£	s.	d.
By Expenses of Bath Meeting—				
Flukes, for Hire of Rooms	£2 3 0			
Bartrum, for Furniture...	0 7 6			
Clark, for Printing	2 7 0	4	17	6
,, Cost of Proceedings—				
Wm. West, for Printing Plates	£4 1 0			
J. E. Taylor, for Printing	15 8 6	19	9	6
,, Postage		10	5	10
,, Stationery		2	2	5
,, Petty disbursements, including Carriage, Cost of Directing Circulars, etc.		1	3	0
,, Balance in hand		2	4	5
		£40	2	8

1865.			
August, Balance in hand	2	4	5
9 Subscriptions for 1863–4, still unpaid	2	5	0
62 ,, ,, 1864–5 ,,	15	10	0

Examined and found correct,
JOHN CHURCHILL,
W. SUMNER.

BIRMINGHAM, *August 22nd*, 1865.

The adoption of the Report having been proposed by Mr. Arblaster, seconded by Mr. Davis, and carried, the President addressed the meeting as follows:—

THE PRESIDENT'S ADDRESS.

When the British Association for the Advancement of Science met at Newcastle-on-Tyne, and the preliminary meeting of this Conference took place, as it were, under the wing of that cheerful institution, it was with great diffidence and a strong sense of inability efficiently to fulfil the duties of President, that I was induced to take upon myself the responsibility of endeavouring to guide it into what I hoped would be a useful, healthy, and happy existence. When we met again at Bath, and discussed the results of your labours in the interim, it seemed to be your pleasure I should resume the office, and it was with the same feeling of deficiency as on the former occasion, that I acceded to the desire, but with, perhaps, less reluctance, having experienced so much kindness, urbanity, and consideration from all with whom I had been associated, especially from the treasurer and secretaries, who exerted themselves with characteristic energy to render my duties light and agreeable. These, Gentlemen, are the causes that have led to my being in the position in which I appear on the present occasion, and however great may be my deficiencies, I trust they may not stand in the way of your interest and pleasure.

How far our meeting at Bath was a success is evidenced by the number and interest of the papers read on that memorable occasion, the variety of the topics treated upon, and their importance to us as chemists and pharmaceutists. The favourable tone of medical and other journals in their review of our proceedings; the private expressions of medical men of all classes; the gratifying communications from our brethren in the United States of America; and the inauguration of a movement of similar character in Germany, relative to which the attention of this Conference in its business capacity will shortly be invited, alike bear testimony to the sphere of usefulness open to us.

The number of enrolled members on that occasion was comparatively small, but mere numerical strength is no test whereby to gauge our efficiency, for in accordance with our constitution and rules we are all *working* men, hence the life, the power, and the success of that meeting. It is from the united efforts of a few willing heads and hands that all associations must look for their scientific, intellectual, and material advancement. These elements I trust we possess in an eminent degree, and so long as they exist, will our success, prosperity, and usefulness exist also.

Before I undertake any remarks on the progress of pharmacy during the year just now passed, you must permit me to make some allusion to one or two subjects of more general interest which then excited the earnest attention, not only of every grade of the medical profession, but even of a considerable portion of the public, namely, the new British Pharmacopœia, and so-called Accidental Poisoning, neither of which has lost anything of its importance, and at the risk of somewhat tedious repetition I must refer to one or both on this occasion.

A work like the British Pharmacopœia, which was an amalgamation and concentration of three sets of formulæ issued by three distinct medical bodies, was not likely to be presented to the profession and the public without a considerable amount of opposition and virtuous indignation on the part of a large number of those affected by the change, and whose rule of practice had been in accordance with one or another of the three hitherto independent schools of medicine; and such was the case. Whatever were the merits of the new work, and however desirable it might be to reduce the practice of the United Kingdom, and, as far as possible, its dependencies, to one uniform code or standard, the feeling of surprise and vexation at the apparently wholesale slaughter of vested interests was at first very great; but judging from the little that is now heard of the subject, one can but arrive at the conclusion, either that the new regulations laid down are widely ignored, or that chemists, both wholesale and retail, are gradually falling in with them. I hope it is the latter; for so far as my limited means of judging allow me to form an opinion on the subject, the difficulties are not so great as at first sight appeared. On one point at least the Medical Council seem to have been unjustly judged in respect to the form in which the work was issued: I allude to the publication of the bare formulæ for preparations, without note or comment on their properties and doses. But those reviewers who have laid so much stress on this apparent deficiency, seem to have ignored the fact that the Pharmacopœia itself has always been published in the same way. They have failed to distinguish in reality between the Pharmacopœia and its so-called "authorized translation." Whether it would not have been politic on the part of the Medical Council to have authorized a similar annotated edition, it is not for us to determine. Such a course would have greatly facilitated its general adoption, and have saved much adverse criticism; still, I repeat this fault must not be attributed to the Pharmacopœia itself.

As you are aware, the Pharmacopœia is at present under revision by a committee whose names are a sufficient guarantee that the work will be performed in a manner satisfactory alike to the prescriber, the pharmaceutist, and the purely scientific man; and I anticipate that the new edition will show that the existing volume contains the nucleus of the best medical code which we have yet seen. Probably it will be found that the chemical notation and some other matters of abstract science which vary with the changing opinions of scientific men will be entirely omitted. The physicians will have greater liberty in the use of the old and convenient apothecaries' symbols for grains, scruples, and drachms, and, with the general revision of the work and the removal of many existing inconsistencies, we shall have the insertion of formulæ for a large number of generally prescribed remedies for which it is most important there should be recognized galenical preparations.

Speaking of the Pharmacopœia at home, we naturally turn to the advance of pharmacy in the colonies, which has led to the proposal of the Indian Medical Board to issue a separate work for India; this is now in a fair way towards publication, and I am informed by my friend Mr. D. Hanbury, whose extensive knowledge of Indian materia medica will find ample exercise in the part he has been called upon to take in its preparation, that Dr. Waring, late of Travancore, surgeon to the Madras army, author of a 'Manual of Materia Medica und Therapeutics,' as well as of numerous papers on Indian drugs, has been appointed editor, a committee being at the same time named to assist in the work. Its object and aim is to supply medical men and pharmaceutists in India, as well as the medical students whose education may be conducted in the government colleges, with a mass of information respecting the more useful drugs, including their method of preparation and administration. Particular attention will be given to the introduction into notice of the more important drugs of India, hitherto little employed except by native practitioners. As it will be necessary in most cases to describe the physical characters of the drugs, to point out their place of growth and manner of preparation, as well as to notice their therapeutic applications, the Pharmacopœia of India will have somewhat the character of a dispensatory. It is not intended to introduce into it chemical processes; and certain drugs and preparations specified in the British Pharmacopœia will probably be omitted from that of India, as being either superfluous or not adapted to a hot climate such as that of India. It is intended that the work shall contain lists of drugs in some of the principal Indian languages, in order to facilitate the identification of drugs met with for sale in the bazaars.

The other subject to which I alluded in my last year's address was that of poisons, and the responsibilities of pharmaceutists in connection with them. Danger from this source has by no means diminished since the Bath meeting, but has rather assumed a new phase, which may be best illustrated by an extraordinary case reported in the 'Pharmaceutical Journal,' vol. vi., new series, p. 539. I refer to it to show, or rather to remind you, how open and liable we all of us are to be placed in a most trying position without fault of our own, or even previous idea of what is in store for us, and how needful it is to have our senses awake to every source of misconception and mischief in all cases of such a nature. Any one can get a powder or two from an apothecary or chemist, and a little poison from another,—or, as at Emsborough, from the farmer's private store,—and artfully substitute the one for the other, and so fix the stigma of crime or carelessness on a perfectly innocent person. The motive for such an act may be either malice towards the vendor of the medicines, or to conceal or ward off suspicion from the real criminal. The result would be equally disastrous in either case. An apothecary or chemist whose habits are somewhat irregular would be especially open to a trick of this kind, and render himself liable to a verdict of manslaughter. We know now what has occurred and may any day occur again: the lesson should not be lost.

In this instance, which I take to be familiar to you from the report above referred to in the 'Pharmaceutical Journal,' the source of the poison was most unequivocally indicated by the microscope, and all suspicion was removed from the proprietor of the patent medicine, through the agency of which the fatal effects were said to have been produced. A few copies of the report of the proceedings at the inquest are on the table, which are at the service of those who take an interest in the matter. I hope to have the opportunity of placing before you under a microscope a portion of one of the substituted Steedman's powders, and a portion from that which had been used by the shepherd in dressing his sheep. From these it will be evident to you that the sublimate which had caused the death of the child had been taken from the farm stock used by the shepherd, and not supplied direct from any chemist's shelves.

A similar case, recorded by Mr. Orridge, in the 'Pharmaceutical Journal,' vol. vi., new series, p. 287, where the substitution was of oxalic acid for sulphate of magnesia, and a suicide committed for the purpose of cheating an insurance office, shows our liability to unfair treatment, and the necessity for vigilance against foul play. The discovery of a few crystals of sulphate of magnesia in the folds of the packets indicated the fraud. A case of poisoning by tobacco is noticed in the same volume, p. 341, and is very remarkable and suggestive. Before closing the subject, I may perhaps be allowed to refer you to the report of a committee on "Poisoning, and the Means of Prevention," read at one of the pharmaceutical meetings at Edinburgh, *vide* vol. vi., p. 463. I think we must all arrive at much the same conclusion, namely, that cases of poisoning resolve themselves into two classes, those arising from *design*, and those determined by what is called *accident*, the latter often "having associated with it somewhere germs of carelessness." Nevertheless, I still retain my already expressed opinion, that as a body we are proverbially careful, and that a man must be more than mortal to be free from such liability. It is, however, his bounden duty, by the exercise of care and vigilance, according to the nature of his businesss, to endeavour to reduce risk to its minimum.

Much has been said—I myself have said much, but must still add a few words relative to the social position of Pharmaceutical Chemists. For many years past there has been an increasing desire that those engaged in the dispensing of medicine, and in the practice of pharmacy and chemistry, should be considered rather as engaged in an honourable *profession*, than as following a mere *trade*, however reputable that may be,—the former title implying the educational and other qualifications of a gentleman, the latter mostly a limited education, keeping it on the level of handicrafts. There is no doubt but that for some years past the increase of knowledge following increased facilities for acquiring it has tended greatly to elevate us from the comparatively low position in society which, as a body, we held during the first quarter of the present century: but thanks to the exertions of Pereira, Thomson, Ure, and Fownes, most worthily and efficiently followed by Redwood, Bentley, and others, pupils of all these great and honoured men,—pupils whose names I would mention but that we have only to look around this room, and see the men themselves,—the love of knowledge and scientific truth has taken deep root, and widely spread its grateful and humanizing influence throughout our whole brotherhood; yet however wide-spread, however grateful, beneficent, and humanizing this scientific truth, and the love of it may be, it is by no means the only requisite to entitle the possessor who has to live by it as a calling to the coveted title of a professional man. The world will accord to the physician, the lawyer, the divine, the architect, or the warrior, the right to the title; but to us shopkeepers who are, as it were, rising from the ranks of the army in a struggle for a high position, many other qualifications will be considered necessary, and must be rigidly practised by us before a wide-awake matter-of-fact public will accept us for what we desire to be thought. The love of truth must not be confined to science, and pursued merely in the desire for gain,—although we have an undoubted right to live by our labour, ingenuity, and skill,—but the idea associated with it must be extended to every relation of life: we must be reliable men, of unflinching integrity and honour, whose words must be our bond, and whose lives must accord with our profession; and while resolved to be well paid for our labours and responsibilities, and while to meet the demands of an exacting public we must necessarily exert our ingenuity to devise *something new*, whereby we may avoid being left behind in the great struggle for existence, let us beware that we do not trench on other men's grounds or fields of action,—let us strive to do unto others as we would have them do unto us. There is no trade or calling with which I am acquainted that is so capable of a high development as that we are privileged to follow. Some of the greatest and most honoured men in Europe have been chemists and pharmaceutists, keeping open shop for the sale of their commodities and the dispensing of medicines. I allude to such men as Godfrey Hankwitz, Luke Howard, William Allen and John Bell, in England; Pelletier, Guibourt, Fordas, and others in France; Scheele, in Sweden; and in Germany a host of names, all of whom will be handed down to posterity for generations to come as benefactors to society, and fit associates of princes. What these men have done we also can, in some degree at least, emulate; and by following earnestly such examples do all that is needed to induce the world at large to accord to us the position we seek. But if in an unhealthy and questionable competition we strive to secure the largest share of trade to our own individual selves, we shall degenerate into practices which will ever keep us, both in fact and in public estimation, deservedly in the ranks of mere hucksters.

If I may be allowed to explain what I mean by an unhealthy and questionable competition, I would allude first to the low prices frequently charged for all sorts of medicines, whether as dispensed prescriptions, or as drugs demanded over the counter. If such things as tinctura opii, tinct. benzoini comp., tinct. rhei comp., spiritus ammoniæ aromat., sp. ætheris nit., etc. etc., are sold, as in many places they are, at 2*d*. and 3*d*. per oz., it is quite clear that if the whole were profit it would not be more than enough; and if properly and honestly made, we know that the proportion of profit must be small and inadequate indeed. But another, and to me, an even more disreputable form in which these malpractices are carried on, is in the attempt which is now so common, to secure profit by pirating preparations which have yielded the legitimate fruit of pecuniary profit to those whose industry and skill have led them to methods of preparing articles in which we, as chemists, are concerned, and whose energy has led to their general introduction. It is not easy for me to pick out special examples, because the most flagrant cases are those connected with secret remedies, which I would not appear to hold in connivance; but the principle is the same in any case, and the dishonesty is not the less apparent because the original article is one which has been introduced in a form I cannot approve. Need I mention "Chlorodyne," and its numberless low-priced imitations, or the French "Papier Moure," which has now become a domestic institution? If half the ingenuity which has been expended in devising a mere deceptive name, like "Papier Mouche," had been exerted in a legitimate direction, the clever imitator might have possessed an original and more lucrative means of accomplishing the end in view. Many similar cases will occur to you all. Such practices as these are "verily the dead flies which cause the ointment of the apothecary to send forth a stinking savour."

While speaking of the question of the prices charged by chemists for the various articles in which they deal, I may just mention an effort which has been made by the Chemists' Association of Edinburgh to establish a uniform system, by printing periodically, under the direction of a committee, a list for the guidance of the chemists in that city. Without entering into the question of the tariff therein adopted, which, as a rule, may be a fair and remunerative one, I might just observe that the charges for dispensing seem to me unusually and unnecessarily low. It is necessary for us, with the conditions of education for the necessary performance of our duties, that our remuneration, in respect to dispensing, should assimilate to that of professional men, rather than of mere traders. Neither would my experience lead me to believe that the public require such excessively low charges, and, indeed, that they value more highly medicines prepared at the ordinary metropolitan, rather than at competition prices, which imply a less-skilled labour. I would suggest, as worthy the consideration of this Conference, with the success of the Edinburgh experiment in view, whether a committee might not be appointed to consider the whole question, and to report to a future meeting. It is a subject which the Pharmaceutical Society, as a corporate body, cannot move in, and one which is manifestly within our scope.

Another subject which occupied some attention at our last meeting was the use of methylated spirit of wine for purposes not contemplated in the law which gave duty-free spirit as a boon to manufacturers. The abuses attending its general introduction are happily, as might have been expected, rapidly working their own destruction. The excise authorities, who for a long time treated with contempt representations made to them by those practically acquainted with the devices made use of by unprincipled dealers, and best aware of the extent and nature of the abuses to which it was subject, have at last opened their eyes to at least some of the facts of the case, and they have now issued regulations to restrain the sale of certain abominations, which, under the colour of medicine, had been largely vended as mere stimulants. These regulations are as follows:—

"That the attention of supervisors and officers be directed to certain apparently medicinal preparations of methylated spirit sold under the name of 'Indian Brandee' and 'Whiskee,' and if in any instance it can be ascertained that these or similar preparations, by whatever name known, are sold or used in any other manner than as medicine, the circumstance is to be reported.

"No such preparation, nor sulphuric ether, sweet spirit of nitre, nor any other medicated spirits made from methylated spirit can be legally kept or sold by any licensed spirit retailer."

This is one step in advance, but by these extracts from the lately issued excise regulations it is evident that we are as a body looked upon with less suspicion than some of our neighbours, and it behoves us to beware how by heedless or wilful conduct we do aught to compromise the confidence accorded to us by the Inland Revenue Officers.

With regard to the employment of methylated spirit in medicine, we can only at present say that the action of methylic alcohol, even in its purest form, taken internally is so widely different from that of spirit of wine, and is altogether so uncertain and variable, that the duty of the Pharmaceutist is simple and well-defined, to abstain entirely from its adoption for any Pharmacopœia preparation.

There is not much worthy of note in respect to newly-introduced remedies since we last met, except in what is to us of scarcely second importance,—the question of additions to the diet of the sick-room. So large an amount of attention has been attached to two substances, that I can scarcely pass them over unmentioned. The tendency of medical practice in the present day is, perhaps, against us in the matter of physic, but it is assuredly in our favour in respect to regimen, and we may yet live to see the time when our leading pharmaceutists may have to devote a still larger portion of their attention to dietetic articles. The two substances alluded to, namely, malt as an addition to the food of infants, and the extractive matter of meat as a means of procuring a convenient and easily digested animal food for the sick-room, owe their origin to the suggestions of Baron von Liebig. As they are stamped with the authority of his name, it will ill become me to express any decided opinion as to the merits of either. Without doubt the malt flour has been found to answer in many cases where other foods have been rejected, though I suspect that its chief value will be most apparent in these exceptional cases. With respect to the extract of beef I shall say nothing; it has come into such extensive use that its very success seems to be the most likely chance of its failure. It is a subject which I hope will be brought forward by some member for discussion at the present meeting, and failing other introduction, I trust that my friend Mr. Brady, who, I know, has recently been at Munich, its birthplace, if I may so term it, and has had conversations with Professor Pettenkofer, may have something to say with regard to it.

And now, Gentlemen, though I might continue this address almost indefinitely, it is time that I concluded, giving place to the business which you are here assembled to transact. From the harmony and good-fellowship everywhere manifested in our debates on the last occasion I had the honour of occupying the position as your chairman, I know that no advice is needed from me on the necessity of patience and forbearance in the consideration of the many important papers which will be laid before you, and in the expression of opinion bearing upon them.

But I cannot close my address by merely congratulating you on assembling in this great centre of midland industry, without expressing the great gratification I have in meeting so many members newly enrolled. Still less can I omit to say a word or two on our reception here; we, some of us, feared that the energetic and kindly hospitality we experienced last year at Bath was too bright a beginning to be taken as a type of what our meetings might be expected to be: but, Gentlemen, any forebodings the more anxious of us might have had vanished before we had been in your noble town for an hour, and I feel that I cannot express, in terms strong enough, the great obligation I feel, not only on my own behalf, but on that of the Conference, to your local committee for the kind attention they have shown in the complete and careful arrangement which they have made for our comfort and convenience. I regret deeply the absence of your local secretary and the cause which prevents his being with us at this meeting, though his place has been well filled by his relative, Mr. Dymond. I am quite sure that when our sittings shall have terminated, we shall look back with the same pleasure to the gatherings we shall have held in this room that accompanies the retrospect of all previous experiences associated with the British Pharmaceutical Conference.

Mr. T. W. Holdsworth (Birmingham) proposed, "That the best thanks of this Conference are due and be now presented to the President, Mr. Henry Deane, for his interesting and valuable inaugural address, as well as for his uniform interest in the progress of Pharmacy and efficiency of the Drug trade in this country." He (Mr. Holdsworth) had listened to the address with inexpressible pleasure, and had been struck with its manly, hearty, and honest tone.

Mr. Jones (Leamington) seconded the resolution. He had met Mr. Deane at Bath, and had then derived much valuable information from the outpourings of his well-stored mind. The Conference was the fruition of the educational labours of the Pharmaceutical Society during the past twenty years. It was to a large extent those who had received their professional education at Bloomsbury Square, who were now joining in the efforts of the Conference for the systematic advancement of Pharmaceutical science. Such a fact was the best testimonial to the value of that institution.

The resolution having been carried,

The President, in acknowledging the vote of thanks, observed that the honourable position he held amongst them on this occasion was largely due to a resolution he made on entering the drug trade, that it should afford him the chief source of his pleasures through life, and that by adhering to this rule so early laid down, he now experienced the highest gratification in the approval of the Conference in his humble efforts to serve the cause they had undertaken.

The reading of Papers then commenced.

ON THE WATERS OF THE PHARMACOPŒIA.

BY MR. J. C. POOLEY.

The questions proposed on this subject read as follows:—

"Distilled waters: should these be prepared from the raw material or from the essential oil?"

"Can any be prepared without distillation?" (which sounds rather paradoxical).

"What are the advantages and disadvantages of the addition of spirit to, and of the retention of, the excess of oil in contact with them?"

In 1696, the 'New London Dispensatory' contained no less than one hundred and sixty-seven "simple distilled waters;" in this paper, however, the waters considered are those of the British Pharmacopœia. They are twelve in number, the first being simple distilled water.

It is well known that simple distilled water will not keep long in a perfectly pure state; change and decomposition occur, however carefully it may have been distilled and preserved. Formerly, I distilled about 20 gallons at a time, and kept it in a well-closed copper cistern; but discovering in it on one occasion, a confervoid growth, I have since adopted the plan of distilling only half the quantity at a time, keeping it upon a convenient shelf by itself in half-gallon glass bottles, simply capped with paper. The bottles are filled direct from the still; we can always see that it is in good condition, and have simply to exchange empty for full bottles to keep a supply in the dispensing department.

We next come to camphor water. I think I am right in saying that the general impression is it contains a homœopathic quantity of camphor when made according to the Br. Ph. This impression is not however universal. I know a medical gentleman in large practice who seldom or never orders a mixture to be made up in quantity with camphor water alone, but 1 or 2 ounces, and then to fill up with distilled water. May we not gather from these extremes, that there is a cause for such diversity of opinion as to its medicinal power? In order to arrive at some conclusions as to the quantity of camphor dissolved in the Br. Ph. process, I cut carefully and weighed exactly 120 grains of fresh camphor divided into four pieces, put them in muslin, with a glass weight to sink it, into a half-gallon bottle of distilled water, corked and left it for two days. I then withdrew the pieces of camphor, carefully dried them with blotting-paper, and weighed them; they had only lost 6 grains. I then re-cut them into about twenty pieces, put them again in muslin into the bottle, let it stand five days, shaking occasionally, and at the end of that time the dried camphor only weighed 100 grains; thus by the first process only $\frac{1}{20}$th of the gum was dissolved, by the second part $\frac{1}{6}$th part. I think this is sufficient to show a necessity for more definite instructions than those of the Br. Ph.

We will now consider in a class the cordial aromatic waters, viz. caraway, dill, cinnamon, fennel, peppermint, spearmint, and pimento waters; and I here venture to express an opinion, that all of these can be better prepared by triturating the essential oils with chalk than by distillation. I have samples of peppermint and spearmint waters, distilled under the most favourable circumstances from the choicest portions of the fresh green herb, just bursting into bloom, and they at present, as to aroma, compare favourably with the samples made from the oils; but before many months are past they will give evidence of incipient decomposition, and then, even in aroma, be inferior to the samples made from the oils. But is the slightly more agreeable aroma the chief consideration in these waters? Is it not rather their medicinal power, their uniform strength, and their freedom from incipient decomposition? When distilled from the raw material, whether fruit or herb, there is always in the water some mucilaginous matter, which by degrees degenerates into confervoid growths; but the pure essential oil seems to have a preservative power on the water, as waters so impregnated will keep longer than plain distilled water. Besides this, there is the fact that such waters can be prepared at any season of the year.*

I have now to speak of rose and elder-flower waters. Of these it can scarcely be said, that their medicinal power is the chief consideration, and therefore the

* Samples of nearly all the waters, made respectively by distillation from the raw material, and by trituration with the essential oil, were submitted to the meeting.

remarks I have used against distillation do not apply to them. In former days, at the proper season, it was my custom to distil rose-water from the flowers in rather large quantity. It was a period of some excitement amongst us, and as quickly as possible a given weight of the latter was placed in the forty-gallon still, with a due proportion of water, and the product secured. But sometimes wet summers spoilt the roses, and rose-water from more genial climes was introduced, and by degrees the old plan was given up, and now we have two sorts of rose-water in use,—one made from otto for common purposes; the other, the best French distilled rose-water, for eye-lotions and for connoisseurs. I do not think it will again be worth while to distil rose-water in this country from the fresh flowers. Pickled flowers yield a fair product, though inferior to good French eau de rose. Elder-flowers can be more easily procured in good condition, and when pickled and distilled yield very good elder-flower water,—superior, I think, to that distilled from the fresh flowers.

We have now only one more of the waters of the Br. Ph. to notice, that is cherry-laurel water, and as I have really no personal experience in its distillation, I may, perhaps, be allowed to quote the words of Mr. Harry Napier Draper upon this subject.

In the Pharm. Journal, vol. ii. second series, Mr. Draper writes to show the very uncertain composition of this water. The process is now virtually the same as when Mr. Draper wrote, viz. digest 1 pound of bruised fresh leaves of laurel in $2\frac{1}{2}$ pints of water, distil 1 pint *secundum artem*, and filter.

Mr. Draper says, "Laurel water thus prepared is nothing more than a dilute solution of hydrocyanic acid, to which a small quantity of volatile oil gives its peculiar odour and taste. The dose is by no means well fixed, being given by some authorities at from 10 to 20 minims, and according to others ranging from $\frac{1}{2}$ drachm to 1 drachm. . . . The chief cause of the uncertainty of this preparation lies in the fact that the quantity of hydrocyanated oil obtained from the leaves, varies with their age. Thus, Christison found that 1000 grains of the buds and unexpanded leaves of May and June gave 6·33 grains of oil, but when in July they had attained their full size, the same quantity yielded but 3·1 grains. In May following the quantity had diminished to 0·6 grain. Not only is the quantity of oil liable to variation, but what is still more important, the quantity of hydrocyanic acid which it contains is uncertain, varying, according to different writers, from 2·75 to 7·66 per cent. Zeller states that the leaves gathered in wet cold weather, yield more hydrocyanic acid than when they are collected in hot dry seasons. . . . As the whole of the oil comes over in the distillation with the first few ounces of water, if the whole product be not strongly agitated together before filtration, a uniform preparation will not be obtained even if other conditions be favourable. . . . In addition to the other sources of inaccuracy, there is one which has by no means attracted the attention which the importance of the question seems to me to deserve; it is this,—Liebig and Wöhler, in their analysis of laurel-leaves, though unable to detect amygdalin, concur in opinion as to its existence. If this be the case,—and all analogy leads to the inference that it is,—the well-known action by which this body gives rise to hydrocyanic acid, should surely not be overlooked, as the duration of the digestion of the leaves in water, now considered as a matter of secondary importance, would then exercise a considerable influence over the amount of active matter contained in the product."

Mr. Draper then gives facts which illustrate this inconstancy in the composition of cherry-laurel water. "Fouquier has given 12 ounces in a day, without any evident effect. Sir T. Boughton's death resulted in half an hour from taking 2 ounces. In another case, mentioned by Pereira, $1\frac{1}{2}$ ounce caused death in an adult. . . . Thus, if on the one hand, bad results do not often ensue from its administration, on the other the practitioner must frequently experience much disappointment from the inactivity of a medicine which he believes to contain 12 per cent. of Pharmacopœial hydrocyanic acid." He then recommends two methods of palliating, if not remedying the evil. The first is, frequent distillation from fresh leaves, with the product standardized in the manner directed in the London Pharmacopœia, for fixing the strength of its dilute hydrocyanic acid. The second is the manufacture of this water, by dissolving a fixed proportion of well-preserved oil of cherry-laurel in a given quantity of distilled water, and adding to it a due proportion of hydrocyanic acid. Mr. Draper concludes by saying, "From the facility with which this (the latter) water could be made, no valid excuse could be found for not throwing it away, when from any cause it had become deteriorated."

I would venture to add that this water may fairly be said to owe its medicinal power to the hydrocyanic acid contained in the essential oil; therefore, if, as it appears, there is of necessity, so great inconstancy in its strength, under the ever varying circumstances of its manufacture, would it not be wiser and safer, to recommend, if not to substitute, a solution of hydrocyanic acid, of the proper strength, to represent normal cherry-laurel water? I leave the meeting to express its opinion upon this subject.

I have now only to bring before you evidence for or against the plan of adding spirit to the waters of the Pharmacopœia, and I may be permitted to say, I have never entertained an opinion in favour of its use. I have not found it to possess any preservative power in the proportion allowed, and as these waters are usually prescribed in doses of an ounce or more, I could not think it safe to add a larger proportion. I also think the fact that it dissolves the surplus essential oil, is an objection to its use, as not contemplated in the idea of a simple distilled water; and the introduction also of a potent element like alcohol as not reckoned upon by the prescriber. In an article in the Pharm. Journ. for 1845, by George Warington, Esq., I find the following:—"In the course of other investigations, I found that when a small quantity of alcohol was added to distilled water, and the mixture kept exposed to the air for a length of time, the containing vessel being carefully covered with paper to exclude dust, it became gradually converted into acetic acid; and by analogy I was led to believe that the same effect would take place in the distilled waters. . . . Equal portions of the waters distilled with the oils of dill, caraway, pimento, spearmint, and cinnamon were taken, and to one portion of each, the quantity of spirit ordered by the London College was added, the other portions remaining in their original state; these were all loosely corked, marked, and placed aside. After remaining six months, they were examined, when the spearmint and caraway waters *with the spirit* were found to be distinctly acid, reddening litmus paper, and effervescing with carbonated alkalies; all the others remained perfectly sound."

I think that although it is about twenty years since Mr. Warington wrote the foregoing, we can hardly ask more satisfactory evidence against the addition of a small quantity of spirit to waters, to preserve them.

In conclusion, the name "*distilled* waters" is not applicable to the whole of the waters of the Br. Ph. The term "waters" would be so, and would be suffice. No one process is best adapted for the preparation of every water. In the case of dill, caraway, cinnamon, fennel, peppermint, spearmint, and pimento, a more uniform and stable product can be obtained by triturating the oil with precipitated chalk, than by distillation. For rose and elder-flower water, distillation from pickled flowers is the best in our climate. For camphor water, a more definite plan, embracing more minute division and longer maceration is desirable. For cherry-laurel water, frequent distillation and the product standardized according to Mr. Draper's suggestion, is the best when it is practicable, but in other cases, a solution of hydrocyanic acid of a suitable strength is preferable to a deteriorated article. Lastly, the addition of spirit in small quantity to these waters is condemned by experience, as not preventing but increasing the tendency to form acetic acid.

The PRESIDENT expressed concurrence in Mr. Pooley's opinions. He was strongly impressed with the importance of using distilled water only, even in such cases as the preparation of tinctures. Nothing could be clearer than the error of adding spirit to medicated waters; a large percentage was, of course, improper, because of its physiological action, and a small amount involved certain acidity. With regard to aq. laurocerasi, he had found that in spring the very young leaves of the shrub contained but little of the volatile and active principles, when at maturity a maximum of these was reached, and in autumn it had again declined greatly: he hoped the preparation would soon go out of use.

In reply to Mr. Brevitt, Mr. POOLEY stated that he had not made any experiments upon preserved flowers.

Mr. SCHACHT was glad that the author's results favoured the use of the volatile oils, since every consideration of convenience to the dispenser tended in this direction. In his neighbourhood, aq. laurocerasi was much used. It was a critical preparation, and not only did the percentage of hydrocyanic acid vary greatly, but the same might be said of its accompanying volatile oil. Since the flavour of this oil was the only ground for the use of cherry-laurel water in preference to hydrocyanic acid, a want of uniform composition was a troublesome fault. After filtration, changes occurred which produced floating particles again.

Mr. BRADY urged the objections that existed to the use of magnesia for the preparation of medicated waters, since volatile oils were mostly liable to become oxidized when acid products resulted.

Dr. ATTFIELD pointed out further, that even in their fresh and unchanged state, volatile oils were composed of two proximate principles, one a hydrocarbon, and the other an oxidized principle, sometimes having qualities of an acid; thus, pimento oil contained very large quantities of eugenic acid. These oils might decompose chalk, and certainly would decompose the ordinary basic carbonate of magnesia with production of soluble soaps, making the water abnormally and unpleasantly strong. Ground flints, an impalpable powder of silica, very largely used at potteries, was the best agent to use in making medicinal waters by trituration with essential oil. He took some exception to the method adopted in determining the strength of camphor water, and suggested further experiments.

Dr. PARKINSON inquired if copper cisterns had been found to contaminate distilled water, but the replies were negative. The same speaker advocated kaolin instead of powdered silex.

Mr. CASWELL endorsed the use of kaolin. It was for pimento water that he first tried it, in consequence of the troublesome deposit which occurs upon bottles containing this water. The result was quite successful.

Mr. REYNOLDS said that the choice now appeared to be between kaolin and powdered silex, as prepared for pottery. The substitution of fine sand could not be regarded as desirable. Some comparative experiments between the two diffusants might soon decide which of them was least open to such objections as choking the filters, etc.

Mr. RICHARDSON and several other members spoke in favour of the use of ground flint.

ON BLUE PILL.

BY MR. F. B. BENGER.

The state in which mercury exists in blue pill can be no longer a matter of conjecture among Pharmaceutical Chemists. In the present day men are not much given to placing implicit confidence in supposititious or popular notions, but prove all things for themselves, and it is remarkable that until recently, frequent assertions were made in the medical and chemical journals, that the efficacy of "blue pill" was dependent upon the amount of oxidation which had taken place in the metal; it has however been periodically shown that the mercury is simply in a very fine state of division, and my own experiments are only confirmatory of this fact: in no case has the trace of oxide present been at all adequate to produce the effects of blue pill. Nevertheless, mercury in its ordinary condition being inert, it is reasonable to suppose that some further change takes place in it before it affects the system; what this change may be, it is no easy matter to determine, possibly it is oxidation in the stomach, so large a surface being exposed to the action of that organ.

The specimens examined were repeatedly washed with distilled water, to remove the soluble part, and then digested with hydrocyanic acid, by which any oxide present would be converted into cyanide and metallic mercury; but mere traces only could be detected. The mercury was then separated by solution, in dilute nitro-hydrochloric acid, from which it was precipitated as sulphide; other specimens were treated with dilute hydrochloric acid, which should have converted any suboxide or oxide present into subchloride or chloride; the result was analogous to that obtained by the former process.

The variation in colour, consistence, etc., in the commercial "blue pill," led me to suppose that the mercury was in a much more finely divided state in some cases than in others, and this supposition was strengthened by the variable amount of boiling requisite to separate it. A microscopic examination at once proved this; in some instances the mercury was so intimately mixed with the other ingredients of the pill mass, that no globules were distinguishable even with a high power, whilst in others they were easily detected by the aid of a pocket lens only.

Assuming that every sample of "blue pill," in the market, contains the proper proportion of mercury, it is still an unsatisfactory preparation, lacking that uniformity of condition so desirable in a medicine, and especially in one so commonly prescribed as this. The process by which it is made, is one so tedious and difficult that very few pharmaceutists attempt to prepare it for themselves. One of the largest makers informs me that, in order to amalgamate them, he grinds the ingredients together for thirty hours, under a pair of millstones, weighing $1\frac{1}{2}$ tons each.

The directions of the Pharmacopœia are somewhat indefinite,—rub the ingredients together "till globules are no longer visible." Now, supposing this object to have been accomplished, we have a "blue pill," containing mercury, in a finely divided state, but let the mass be still further triturated, and the metal will be yet more finely divided,—it being rather difficult to place a limit to the divisibility of a fluid. Thus, multiplication of particles may be carried on *ad infinitum*, and probably the activity of the pill proportionately increased; it is, therefore, very desirable that some process be devised by which the Pharmaceutical Chemist can make his own pil. hydrarg., and which shall yield a product of uniform composition. By such a process I have prepared some specimens (shown to the meeting). They are of a beautiful blue colour, and the minute state of division in which the mercury exists in them may be easily demonstrated by suspending a few grains in a glass of water.

The mode of preparation I have adopted, is as follows:—136 grains of chloride of mercury (corrosive sublimate) are dissolved in 4 oz. of distilled water, and the solution raised to the boiling-point; an ounce of protochloride of tin is then put into a beaker with 2 drms. of hydrochloric acid, and 2 oz. of cold water, to which, when dissolved, the mercurial solution is added, and the mixture stirred for a few seconds. The precipitated mercury, in the form of a nearly black powder, is then allowed to subside, washed several times by decantation with dilute hydrochloric acid, to remove any traces of tin, and finally with distilled water. It would, of course, be impossible to dry and weigh this precipitate without causing the excessively minute particles of mercury to unite into one globule; but, as we know that 136 grains of chloride yield 100 grains of metallic mercury, this is unnecessary. The water is then drawn off, as nearly as possible, by means of a pipette; 30 grains of sugar, 100 grains of powdered liquorice, and about ʒj of glycerine added, and the mass transferred to a warm porcelain slab, where most of the remaining water is evaporated at a low temperature, a sufficiency of glycerine and liquorice being used to make the mass weigh 300 grains.

The power possessed by protochloride of tin of reducing salts of mercury, is well known; the decomposition is as follows:—The tin salt being converted into bichloride,

$$SnCl\begin{cases}Cl \\ Sn\end{cases} \qquad SnCl_2 \text{ in solution.}$$

$$HgCl\begin{cases}Cl \\ Hg\end{cases} \qquad Hg\text{, thrown down.}$$

A very high temperature is not requisite to produce this change. The solution of the protochloride of tin should be effected without heat, and should not be very dilute, as in either case a basic salt is liable to be thrown down, especially if no hydrochloric acid be present. It is desirable also to employ a considerable excess of the tin salt to ensure the reduction of the mercury; if insufficient be used, only calomel will be formed. The precipitate will be found to vary slightly in colour, according to the temperature at which it is produced, but I think that this being uniform and the solutions of a definite strength, unvarying results may be obtained. The sugar has been added to assist in the preservation of the mercury from oxidation, and the glycerine to prevent the mass from becoming dry.

These appear to be the only precautions necessary to produce a "blue pill," which is, I believe, superior to that obtained by the old process, and which can be prepared by any man who possesses two porcelain bowls, a Bunsen's gas-burner, a tripod, a few grains of common sense, and a little knowledge of pharmaceutical manipulation.

1, *Market Place, Manchester.*

The President said that the suggestions made in this paper appeared to him to be highly ingenious, and the process was well deserving of a trial. He remembered that many years since, a leading manufacturer introduced to London chemists what purported to be a great improvement in blue pill, but as it was found to nauseate all who took it, its condemnation soon followed.

Mr. G. Dymond had found that steam-made blue pill was not unfrequently complained of in the manner alluded to by the President, whilst that made by manual labour gave satisfaction. It appeared that in the former mode of preparing it, time was no object, and that a much longer exposure to the air took place, producing the grey oxide of mercury. He thought Mr. Benger's plan deserving of a trial. The samples exhibited were very nice.

Dr. Attfield considered that caution would be needful in the adoption of this process. Several precautions occurred to his mind, the neglect of which might cause the result to be very different to what was expected. The temperature of solution, the time of standing, etc., might influence the coalescence of the particles of mercury and consequent degree of division. He thought Mr. Benger had not proved that the particles of mercury prepared in the manner described were always uniform in size.

Mr. Brady presumed that if the process were adapted for blue pill, it might also answer for the manufacture of grey powder.

Mr. Brevitt spoke of some cases which had lately come under his notice, in which the green iodide of mercury had produced very unpleasant symptoms, although it had been taken from the same bottle previously without bad effect: the iodide had been washed with spirit to free it from any red iodide.

Mr. Reynolds suggested that the remedy had met with some incompatible substance after administration to the patients. He had seen the native sulphide of antimony prove poisonous, apparently from its sulphide of arsenic made soluble by an alkaline fluid in which it was given.

The Conference adjourned till 4 P.M.

NOTE ON BISULPHATE OF POTASH.

BY MR. BARNARD S. PROCTOR.

A sample of "bisulphate of potash," obtained from a well-known firm of manufacturing chemists, on examination proved to be sulphate, with only a trace of quasi-free acid. The manufacturers, when written to, said they had supplied that article for some years as bisulphate, it being the salt generally known under that name, but at the same time offered to make a true bisulphate if required.

Below are given the results of examination of the first sample, A; the sample made to order, B; and two others obtained from retail sources: several applications for the article proving that it is not generally kept by Pharmaceutists:—

A	gave	0·4	per cent. of	quasi-free acid.
B	,,	30·0	,,	,,
C	,,	31·0	,,	,,
D	,,	31·0	,,	,,
Theory requires		29·5	,,	,,

A was dry, and in little masses of small crystals. B was in dry fused cakes, with a crystalline structure. C was a damp crystalline powder similar to "salt of tartar" of commerce. D was in damp broken crystals, in appearance resembling chlorate of potash of commerce; it was supplied as Howard's super sulphate of potash.

Grey Street, Newcastle, August, 1865.

ON THE IODO-HYDRARGYRIDE OF POTASSIUM AND THE OXIDATION TESTS FOR METHYLIC ALCOHOL IN THE PRESENCE OF ETHYLIC ALCOHOL AND SOME OTHER ORGANIC BODIES.

BY MR. JOHN TUCK.

At the Bath meeting of the British Pharmaceutical Conference, it was shown that oil of cloves had the same effect on the iodo-hydrargyride of potassium test for methylic alcohol as acetone; it therefore became evident that some additional experiments were necessary, in order to determine whether or not the volatile oils or organic principles existing in the tinctures were in any way calculated to interfere with its application, and if so to devise some simple method whereby such interfering agent might be removed previous to the application of the test. With this object in view, I dissolved one drachm of the oil of cloves in nine drachms of spirit of wine; on testing this with the iodo-hydrargyride of potassium, as I expected, there was no precipitate. I next distilled a portion of it, and on testing the distillate I obtained the reaction characteristic of spirit of wine. This experiment teaches us that the worst possible interfering agent can readily be separated by simple distillation.

I have also distilled and tested nearly the whole of the tinctures of the British Pharmacopœia prepared with duty-paid spirit, and in no case have I met with any oil or organic principle that interfered with the test. I obtained the characteristic precipitate in every case, so that the absence of a precipitate with the iodo-hydrargyride of potassium test may be looked upon as conclusive evidence of the preparation being made with methylated spirit. The tinct.

gallæ requires to be distilled carefully, otherwise some portion of the formic acid is carried over with the vapour of the spirit, and on testing it a dark precipitate is the result. In distilling tinct. iodi co. some portion of the iodine is almost sure to be carried over; but if the distillation is conducted with care the small portion that is carried over will not interfere with the test; however, if thought desirable, this may be prevented by adding potash to the tincture previous to distillation.

Since the reading of my former paper at Bath, a process has been published for the detection of methylic alcohol in the presence of ethylic alcohol and volatile oil by Mr. Miller, which is certainly the best and most reliable of all that have been brought forward. I do not, however, mean to say that any new principle has been discovered, or the new application of an old one, for even when the methylated spirit in question was under the consideration of the Board of Inland Revenue, Professors Graham, Hofmann, and Redwood reported to the chairman that,—

"Under the influence of oxidizing agents, methylic spirit furnishes together with other products a considerable amount of formic acid, whilst alcohol under these circumstances yields principally acetic acid. Formic and acetic acids, although closely allied in composition and general characters, still offer a greater number of points of difference than the two alcohols which they represent. Formic acid may be readily distinguished from acetic acid by the facility with which the former precipitates the metals from the solutions of the more easily reducible metallic oxides, such as oxide of silver and oxide of mercury, which are not affected by acetic acid. Unfortunately, this method of testing became inapplicable, since it was found that alcohol free from methylic spirit when submitted to the action of oxidizing agents invariably yields, in addition to aldehyde, which can be resinified and removed by potash, a small quantity of formic acid, so that the presence of formic acid among the products of oxidation of a suspected liquid cannot with certainty be regarded as an evidence of the existence of methylic spirit in the original liquid."

The method adopted by Mr. Miller in applying the principle of oxidation is not capable of being carried out easily nor quickly, but these disadvantages are counterbalanced by the certainty which attends the results of the oxidation of methylic alcohol. As stated by the learned chemists in their report to the Board of Inland Revenue, the presence of a small quantity of formic acid in the oxidation products of a suspected liquid is no proof of the existence of methylic spirit in the original; but, as ethylic alcohol only yields a very little, and as methylic alcohol yields a great amount of formic acid, its presence in quantity after the oxidation of a small portion of a suspected spirit, by whatever method it is conducted, points unmistakably to the previous presence of methylic alcohol, other sources from which it may possibly be derived of course being absent.

The sources from which formic acid may be derived by oxidation without the presence either of ethylic or methylic alcohol are many, so that in every case, before applying any method of oxidation to a suspected spirit, we should first free it from organic matter by distillation or other process,—albumen, casein, gelatine, starch, sugar, both cane and grape, tartaric acid, woody fibre, the cereal grains, and many other organic substances yielding formic acid by oxidation; it also exists, as is well known, naturally in ants, some caterpillars, oil of turpentine, the stinging-nettle, and, it is said, even in some mineral waters.

The method given by Mr. Miller in the 'Pharmaceutical Journal' for last April, is as follows:—"Now put into the flask 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 2 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."

I distilled a portion of the tinct. rhei, of which I have brought a sample, and on testing the distillate with the iodo-hydrargyride of potassium, there was no precipitate, thus indicating the presence of methylic alcohol. On carrying out the oxidation method of detecting it, I obtained further evidence of its presence, thus confirming the reliability of the iodo-hydrargyride of potassium, and proving, beyond all dispute, that the tincture was a methylated one. I think it will be evident that this specimen of tinct. rhei must have been prepared with a cleaned methylated spirit, though very few could, I believe, detect the methylated spirit by the sense of smell alone. If a method of oxidizing the methylic alcohol and of neutralizing the acid so formed could be devised, without distillation, it would wonderfully simplify the oxidation test; although I have made some experiments in this direction, by heating the methylated spirit with a mixture of lime and potash, they have not yet been of a satisfactory nature. I have not tried the action of platinum black on methylated spirit, but presume it would slowly convert the ethylic alcohol into acetic acid, and the methylic into formic acid. According to Dobereiner, spongy platinum, moistened with wood spirit, does not act upon the air, but if moistened at the same time with strong caustic potash, it often becomes heated to redness, and converts the wood spirit, first into formic, and afterwards into water and carbonic acid.

As being very suitable to the present paper, and, thinking too they would prove of interest, I have pleasure in placing before Conference, eight different specimens of methylated preparations, kindly placed at my service by the Chairman of the Board of Inland Revenue, W. H. Stephenson, Esq. There are three specimens of the beverage called "whiskee," three of "brandee," one tincture of rhubarb, and one sweet spirits of nitre. The specimens of "brandee" are all prepared with methylated spirit, without any, or at any rate but little preparatory cleaning, and are all distinctly acid. The "Medicated Indian Brandee," and the "Cordialized Indian Brandee" are all sweetened with sugar. The French brandee or Indian tincture is different to the other two, being much higher flavoured; it is made very sweet with honey, and, I believe, contains saffron as a flavouring ingredient; the colour is derived from burnt sugar, and they all contain more or less sweet nitre. I am not at all prepared to say, positively, in what manner the sweet spirit of nitre comes to be present in these beverages; whether there is a certain amount of sweet nitre added to the methylated spirit, or whether it arises from the addition of nitric acid to the spirit, and then boiling or distilling it, is very difficult to say. I am rather inclined to believe that the latter is the true origin of it, and that the nitric acid is added with the intention of oxidizing the oils in the naphtha, or at any rate modifying the taste and smell of the plain methylated spirit. The three specimens of "whiskee" differ much from each other, the medicated whiskee contains a good deal of sweet nitre and is strongly acid, the sweetening agent here used is sugar, and it is the least sweet of all the beverages; the "Hollands flavoured whiskee" is acid, and, like the others, contains a portion of sweet nitre, and is sweetened with honey. I now come to the last, the best, and the most remarkable of this series of specimens illustrating human ingenuity in cheating the Excise, the "Pure Islay Mountain Medicated Whiskee;" this was at first a colourless and perfectly clear syrupy liquid, which, on being exposed to full daylight in a window, during some very cold weather, became turbid and gradually deposited a lot of flocculent crystals. Not being at that time at all able to understand the formation of these crystals, I forwarded to our President, Mr. Deane, two or three drops of the thick crystalline deposit, for him to examine them microscopically; after the examination, both chemical and microscopical, of this small quantity, he felt quite assured that the source of the crystals was honey. Since that time, there has been a greater deposit of these crystals (a specimen of which was placed on the Conference table). I have chemically examined them and have come to the same conclusion as Mr. Deane; these crystals are, without any doubt, grape sugar, and in all probability derived from honey, which must first have been dissolved and then decolorized, for the finest samples of honey I have yet seen, would certainly impart some degree of colour and turbidity to any solvent, and this specimen of "whiskee" was quite colourless and perfectly clear. Although acid, it is by no means so much so as the other specimens, and it seems also to be flavoured with a slight portion of chloroform. The spirit used in its fabrication must have undergone some kind of "cleaning" process, as this is the most pleasant beverage of the whole series. On distilling a portion of it, and applying the iodo-hydrargyride of potassium, and the oxidation method of testing, the presence of methylic alcohol was thoroughly proved. The compounding of these intoxicating drinks, for it is a sham to call them by any other name (for they certainly are neither "medicinal" nor "cordial," no more than duty-paid brandy, gin, or whisky), is a direct fraud upon the revenue, was never contemplated or intended to be one of the uses of methylated spirit, and should be strongly discountenanced by all honourable men. The Board of Inland Revenue liberally allows the methylated spirit duty-free for the arts and manufactures; and all interested in their welfare—and who is not?—should protest by their words and deeds against the abuse of such a great boon.

To sum up this paper in a few words, I think we may now look upon the question of the "detection of methylated alcohol in the presence of ethylic alcohol and organic bodies" as thoroughly and satisfactorily answered. We can, in the first place, readily detect the acetone, which is always associated with the methylic alcohol, and by the oxidation method of testing, interfering bodies being absent, the methylic alcohol itself.

Wilton, near Salisbury, August, 1865.

Mr. Schacht expressed surprise that volatile oils should not complicate the results of the mercurial test, when tinctures containing them were distilled preparatory to the use of the author's mercurial test.

Mr. Tuck replied that he had so frequently made the experiment, that there could be no doubt about the fact. The distillation should be slowly conducted, and he would avoid boiling, if convenient, and not push the operation beyond the recovery of one-half of the fluid operated on. He thought that the compound nature of oil of cloves might have some influence on the question.

Dr. Attfield considered this view quite legitimate. The boiling-point of the acid portion of oil of cloves was higher than that of its hydrocarbon. He had used both the plans now described, and had placed the excellent method of Mr. Miller in the hands of his students with very satisfactory results. Still, it could not be denied that the operations were more tedious than in the case of the mercurial test, and, in future, he would apply this first; if a precipitate occurred, then no methylic alcohol could be present, and further research would be needless.

Mr. Brady suggested that Mr. Tuck should ascertain the exact point in the fractional distillation at which the essential oils that might interfere with his test came over.

Mr. Brough thought that sufficient stress had not been laid upon the fact that the iodo-hydrargyride of potassium test was only applicable to methylic alcohol contaminated with acetone.

Mr. Tuck said that all the wood spirit of commerce contained acetone.

CAN METHYLIC ALCOHOL OR ANY DERIVATIVE OF IT BE READILY DETECTED IN CHLOROFORM, ETHER, SWEET SPIRIT OF NITRE, AND SAL VOLATILE?

BY MR. JOHN TUCK.

It will, I think, be plain to all, that the detection of methylated spirit, under the varied forms of chloroform, ether, sweet nitre, and sal volatile, is a very different subject, to its simple detection when not in any way chemically altered, and used merely as a solvent or from its preservative effects, as in the various tinctures of the Pharmacopœia. In the former case we have to deal with the spirit after it has undergone some complex changes, or been mixed with various other bodies not removable by mere distillation, whilst in the latter we have only the plain unaltered spirit, which, although it may be contaminated with organic matter, can nevertheless be separated from it by simple distillation. In the case of chloroform and ether, we have to deal not with methylic or ethylic alcohols at all, but some derivatives of them; in sweet spirit of nitre and sal volatile, we have to deal with the spirit holding in solution various other bodies, solid, liquid, and gaseous, and our aim here is to remove or decompose them, so that they shall not in any way interfere with the application of the tests.

Chloroform, as is well known, can be prepared from wood naphtha, acetone, chloral, the acetates of lime, soda, and potash, oil of turpentine, and other essential oils, as well as from ethylic alcohol and methylated spirit. It is, however, generally prepared from ethylic alcohol and methylated spirit, because the resulting product is much purer and the yield greater than when derived from any other source. Chloroform obtained from crude wood naphtha has an empyreumatic odour very difficult of removal, but I expect this entirely results from the oily empyreumatic bodies previously existing in the naphtha. The patent naphtha would undoubtedly yield as fine a sample as any derived from pure alcohol; I am not aware, however, of any having been made from this source.

Although chloroform, like alcohol and oxalic acid, may be derived from many sources, yet, when freed from all impurities, it is of a certain, definite composition. It is said to have been known in former times, but this is very doubtful; we, however, know for certain that Dumas first pointed out its true chemical composition in 1834, and considered it to be the ter- or perchloride of the compound radical formyl C_2HCl_3. The two elements constituting the compound radical formyl, exist in many organic bodies, and in the two principal sources of chloroform are as follows:—

Ethylic alcohol, or spirit of wine . . . $C_4H_6O_2$
Methylic alcohol, or wood naphtha . . $C_2H_4O_2$

and when these are distilled with chloride of lime (chlorinated lime) and slaked lime, some complicated decompositions ensue, and chloroform is produced. It being clear that there can be no chemical difference in pure chloroform, from whatever source derived, and that it is formed as readily from methylic as ethylic alcohol, *it is, therefore, useless to expect any chemical test for distinguishing it, when made, from methylated spirit and properly purified.*

In the preparation of chloroform from wood naphtha, an oily body, lighter than water and containing chlorine, is formed. An oil is also formed in its preparation from alcohol, but it differs from the oil obtained in making it from wood spirit in being heavier than water, and in having a lower boiling-point; the crude methylated chloroform will therefore be contaminated (admitting it to be equally produced from both spirits) for a tenth part of its bulk, with a greater amount of a light oil proportionate to the greater amount yielded by wood naphtha, and it will be evident that the chloroform, if not thoroughly purified, will be of a somewhat lighter gravity than that prepared from pure alcohol,—so that, to sum up all the essential points, good chloroform, from whatever source derived, is a limpid colourless liquid, with a fragrant ethereal odour, and a sweetish taste. It is entirely free from alcohol, ether, empyreumatic oils, chlorine, chloral, or any acid reaction with litmus paper. When evaporated from the palm of the hand, or better from several thicknesses of blotting-paper, it does not leave behind any strong disagreeable smell. Dropped into water it falls to the bottom, and remains perfectly bright; it has a specific gravity of about 1·496 to 1·500, and evolves no gas, or but a bubble or two, when potassium is dropped into it. It is not coloured by agitation with sulphuric acid, and is soluble in alcohol and ether in all proportions.

As the results of many experiments, I can find no difference in the behaviour of the two chloroforms respectively prepared from methylated spirit and from pure alcohol. I should state that I took every precaution to have perfectly reliable specimens of the two chloroforms as standards of comparison, and that Messrs. Duncan and Flockhart kindly assisted me in this inquiry by placing some fine specimens of the chloroforms at my service. I should also state that this eminent firm have told me that they know of no test for distinguishing the pure from the methylated chloroform.

Methylated ether is, I believe, prepared commercially in the same way as that from the pure alcohol: it must therefore be looked upon as being, under ordinary circumstances, a mixture of nearly 10 per cent. of methyl ether (probably contaminated with a small portion of sulphate of methyl) with ethyl ether. Now the problem really to be worked out is the following:—Can a mixture of 10 per cent. of methyl ether be detected in 90 per cent. of ethyl ether? These two ethers differ very much in their general properties and behaviour with other bodies; although both are oxides of their respective radicals, they, so unlike their hydrated oxides or alcohols, have no properties in common.

The oxide of ethyl, or ether, as is well known, is a very volatile, fragrant, colourless, transparent liquid, neither acid nor alkaline, and very combustible. Its specific gravity varies greatly with the temperature and the amount of spirit mixed with it; the ether of the British Pharmacopœia has a sp. g. ·735, and is said to contain about 8 per cent. by volume of alcohol, and to boil below 105°. Absolute ether is said to have a gravity, at a temperature of 60°, of about ·720, and causes intense cold by its volatilization. The oxide of methyl, on the contrary, is a permanent colourless gas, very soluble in water, and still more so in alcohol, wood-spirit, and ether. After submitting the mixed ethers to many experiments, I have to report that I know of no other test for distinguishing the methylated from the pure alcohol ether, than the boiling-point, first pointed out, I believe, by Macfarlan. I find, with him that the methylated ether has a much lower boiling-point than the pure alcohol ether, the difference ranging in my experiments from 14 to 17 degrees of Fahrenheit. I found, on boiling the methylated ether with sulphuric acid (sp. g. 1·848), that it became of a decided brown colour, whilst pure alcohol ether, under the same treatment, remained quite or very nearly colourless.

The existence of methylic alcohol in sweet spirit of nitre is easily proved; without any preliminary treatment whatever, the iodo-hydrargyride of potassium clearly indicates it. The plan I adopt previous to applying the oxidation method of testing, is to mix the sweet nitre with an equal bulk of a solution of caustic potash (twice the strength of the Pharmacopœia solution), and, after allowing the mixed liquids to stand about an hour, I distil off an amount of spirit equal to the original sweet nitre, and then oxidize, as in the case of a spirit distilled from a tincture. I found, on distilling some samples of sweet nitre mixed with the solution of potash, that they boiled with explosive violence, giving off sudden jets of vapour. This, however, can be easily prevented by the well-known method of placing some portions of wire in the retort; for this purpose, iron wire will do.

The method I adopt in testing sal volatile for methylic alcohol, is to first dilute it with an equal amount of water, then neutralize the ammonia with dilute sulphuric acid, and distil carefully over an amount about equal to the original spirit. I then test a portion of the distillate with the iodo-hydrargyrides of potassium; and, if a further test is desirable, I apply the oxidation method of testing to another portion.

In conclusion, to sum up the results of this paper in a few words:—

Chloroform can be, and is, prepared from methylated spirit as good as, and the same in chemical composition as, that from pure alcohol; consequently, there can be no test to distinguish between them, there being no difference in them.

Methylated ether can principally be detected by its boiling-point.

And the presence of methylic alcohol in sweet nitre and sal volatile can be thoroughly proved, by both the iodo-hydrargyride of potassium test and the oxidation method of testing.

Wilton, near Salisbury, August, 1865.

Mr. Reynolds queried if aldehyde, as found in sp. æther. nitr. did not interfere with Mr. Tuck's mercurial test, since it certainly did so in the case of Mr. Emerson Reynolds's test, which the speaker had been accustomed to regard as similar in its results to that of Mr. Tuck.

Mr. Tuck was glad that this question had been raised, since it gave him an opportunity of referring to a charge of plagiarism that had been directed against him. He compared the two mercurial tests, and denied that they were the same when differing so widely. He also might say that he had undertaken the investigation of the subject long before the appearance of Mr. E. Reynolds's paper.*

Dr. Attfield said that no one would for a moment suppose that Mr. Tuck had appropriated any ideas from Mr. Emerson Reynolds; the tests proposed by these gentlemen were, at all events *apparently*, too distinct to admit of such a supposition. As to the rationale of each of the two processes, we must learn a great deal more before asserting that the results were identical, since we were unable to say with precision what those results were or were not in either case. He certainly believed that they would be found very similar. Before sitting down, he would call the attention of the meeting to the subject of chloroform, showing that whether ethylic or methylic alcohol be used the result is identical, the latter being in fact the better source as far as chemical theory was concerned, for chloroform was doubtless the chloride of tri-chlor-methyl ($C_2HCl_3 = C_2\left\{\begin{matrix} H \\ Cl_2 \end{matrix}\right\}, Cl$). The practical point to consider was the freedom of the material from empyreumatic oils; and the great improvements in wood-spirit might be said to have removed any difficulties on this score. If chloroform were made from pure methylic alcohol, there ought to be no distinction between it and that made from spirit of wine.

Mr. Brady remarked that all the chloroform used in the hospitals in Edinburgh was made from methylated spirit.

ON ESCHWEGE'S PATENT WOOD NAPHTHA, AND ITS USES IN THE ARTS AND MANUFACTURES.

BY MR. JOHN TUCK.

In a paper published in the 'Pharmaceutical Journal' for January, 1863, I drew the attention of pharmaceutists to what was at that time a new and remarkable spirit patented in this country, and known as "Patent Pure Wood Spirit," or "Patent Pure Wood Naphtha," samples of which were shown at the late International Exhibition.

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* Mr. Tuck thinks aldehyde might interfere. To remove it he would first distil the liquid with caustic potash.

This spirit was as odourless as ordinary spirit of wine, and as free from any disagreeable taste. It was, in fact, so totally unlike the ordinary wood-spirit or naphtha of commerce, that I felt it to be my duty to ascertain positively that it was one of the many products of the destructive distillation of wood, before making any extended trials of its solvent powers on various bodies. I should, perhaps, here state that naphtha or wood spirit can, when not mixed with fermented spirit, be readily detected by means of oxalic acid, the naphtha being converted into crystals of the oxalate of oxide of methyl, solid at all ordinary temperatures, whilst fermented spirit is by the same treatment only converted into a liquid, heavier than and a little soluble in water. On submitting this new spirit to the action of oxalic acid, the formation of these crystals of methyl-oxalic ether, thoroughly proved it to be wood spirit with which I had to deal.

This patent wood naphtha is obtained from the commercial article by largely diluting it with water, filtering the diluted spirit through large cylinders of granulated charcoal, and then distilling, some portions of the first and last runnings being rejected. It is finally rectified, and sent into commerce as a nearly absolute spirit.

Since the publication of my former paper, I have made many trials on a larger scale of the pure wood spirit, and find its solvent powers to be remarkably similar to fermented spirit, so that it will become of very great importance in those arts and manufactures requiring spirituous menstruums, free from any disagreeable smell, and capable of dissolving the gums, resins, oils, alkaloids, etc. etc., used in their various processes. Ordinary crude naphtha was formerly almost always used in the making of French polish, and for dissolving the lac used in stiffening the basis of silk hats, and in the manufacture of spirit varnishes generally. The great reason for naphtha being so extensively used, and its disgusting odour and injurious effects on the eyes and body generally being submitted to, was on account of the enormous price of fermented spirit, the only other solvent that was at all available,—the price of naphtha at this time being about nine shillings, and fermented spirit nineteen shillings the gallon. In many cases, this high price of fermented spirit operated very injuriously upon the British manufacturers, especially in cases where the lower-priced naphtha could not be used on account of its abominable odour. This evil became at length so great, that, as is well known, the Legislature wisely permitted methylated spirit, or spirit of wine, duty-free to be used, it being, however, first mixed with ten per cent. of ordinary naphtha, in order to render it unfit for use as a beverage, and thus prevent injury to the revenue.

Although this was a very wise and liberal measure, and a great boon to many arts and manufactures, still there are others to which it is of no service whatever. The odour of ten per cent. of ordinary naphtha is, and even if it were only one per cent., would be quite sufficient to effectually shut it out from being used in perfumery, in making the various flavouring essences, and the finer kinds of spirit varnishes. Piesse says, in his 'Art of Perfumery,' speaking of transparent hard soap,—"Until the Legislature allows spirit to be used free of duty for manufacturing purposes, we cannot compete with our neighbours in this article; the methylated spirit has such an abominable odour that it cannot be used for making scented soaps for the toilet." It would, indeed, be a great boon to pharmaceutists, as well as perfumers, and I heartily wish that some plan could be devised, whereby a spirit of wine, without disagreeable odour or injurious admixture, might be allowed duty-free for their respective uses. I feel convinced, too, that the Board of Inland Revenue would be in favour of such a measure for a duty-free spirit, if we could first prove to them that the revenue would not be injured thereby, and in this lies the difficulty.

Pharmaceutists require a duty-free spirit, without disagreeable odour or any admixture which would prove injurious, when the mixed spirit was taken internally, in quantities of at least half an ounce.

Perfumers and others require a duty-free and odourless spirit, but it is not absolutely essential for it to be free from injurious admixture when taken internally.

The Board of Inland Revenue, on the other hand, will only sanction a spirit of wine being duty-free, conditionally upon something being added to it, so as to render it totally unfit for the purposes of a beverage. Another condition is, that such addition to the spirit shall be a permanent mixture, and not removable by any known process, method, or operation.

Now, I think it will be plain to all, that these conditions, as regards pharmacy at least, are extremely difficult of realization, if not impossible, so that I fear we must still continue to use a duty-paid spirit. Although it may not, perhaps, ultimately be an extremely difficult task to not only find a method of rendering fermented spirit thoroughly unpotable, but incapable of being made so, and at the same time adapted for fine varnishes and perfumery, it nevertheless is not at all probable at present.

It is in meeting these hitherto unsupplied requirements of perfumery, varnish-making, etc. etc. (none of which were benefited in the least by methylated spirit), that the patent wood naphtha has become of so much importance, all the essential oils, odorous substances, resins, gums, etc., being as soluble in it, and in some cases even more so than in spirit of wine. In my former paper I gave a list of more than twenty essential oils I had dissolved in it; since that time I have tried its solvent action on many other essential oils and substances used in perfumery, and the general conclusion I have come to concerning it is, that it is a most valuable menstruum, and one well worthy the attention of perfumers and others requiring a spirit for its solvent action. I have made several compound perfumes, using only the patent wood naphtha as a solvent,—amongst them have been lavender water, verbena, eau de Cologne, the "favourite," etc.; and I have pleasure in placing samples of the perfumes so prepared before the Conference, and some specimens illustrating the purification of the crude naphtha,—No. 1, being the mixture of oily hydrocarbons obtained by diluting the naphtha with water, and found floating on the surface of the diluted spirit; No. 2, obtained by distilling the charcoal used in the purification of the diluted spirit; No. 3, the finished patent wood-naphtha, as sent into commerce.

For making transparent soaps, as far as my experiments permit me to give an opinion, it will be found to answer in every respect as well as fermented spirit,—curd, Castile, and other soaps being just as soluble in it. It will be in the recollection of some here present, that a few years ago ordinary wood-naphtha was given and recommended extensively in the treatment of phthisis, and now that it can be obtained free from odour and disagreeable taste, its medicinal action upon the system would form a very interesting inquiry. In cases of painful inflammation, headache, etc. etc., the "Patent Wood-spirit" makes a far better evaporating lotion than spirit of wine in the same proportions, on account of its greater volatility, its boiling-point being much lower. To the naturalist it affords a new and valuable agent for the preservation of his animal and vegetable specimens, being free from the faults that attend the ordinary naphtha. It also promises to be of the highest importance in photography; from some experiments detailed lately in one of the photographic journals, gun-cotton is more soluble in it than in sulphuric ether, and I have seen a good picture taken upon collodion so prepared. The patent wood-naphtha collodion will prove a great boon to photographers in India and warm climates, where the ordinary collodion frequently boils as it is poured on the plate. In conclusion, I have made no satisfactory experiments upon the physiological effects of the patent wood-spirit nor the ethers prepared from it upon the human system. I think there is a large field here open for the investigations of the physician, for undoubtedly some of them will prove to be most powerful agents in the treatment of diseases.

Wilton, near Salisbury, August 21, 1865.

Mr. TUCK said that since his paper was written the authorities had stopped the manufacture of Eschwege's patent wood naphtha, but it was to be hoped that perhaps, under certain regulations, its production would be continued.

This was also the general opinion of the meeting.

ON THE MISTURA CREASOTI OF THE BRITISH PHARMACOPŒIA.

BY MR. JOHN TUCK.

I believe Dr. Attfield first drew the attention of pharmaceutists to the formula given for this preparation in some Lectures on the British Pharmacopœia, delivered before the Pharmaceutical Society; he thought it required to be further investigated, for, if as stated by Pereira and others Creasote was soluble in water to a greater extent than the proportion in which it was ordered in the Mistura Creasoti, what need of adding acetic acid to dissolve it?

I should perhaps state that this was a Scotch preparation, and the formula given for it in the last Edinburgh Pharmacopœia was as follows:—

Creasote,	
Acetic Acid,—of each	16 minims.
Compound Spirit of Juniper,	
Syrup,—of each	1 ounce.
Water	14 ounces.

Mix the Creasote with the acid, then gradually the water, and lastly the syrup and spirit.

The spirit of juniper here ordered was a proof spirit, made by macerating the berries and seeds with the proof spirit for two days, then adding water and distilling off the whole of the proof spirit.

In the British Pharmacopœia, the Scotch formula was altered to meet the greatly-increased strength of the spirit of juniper there ordered, so that it now

Creasote,	
Glacial Acetic Acid,—of each . . .	16 minims.
Spirit of Juniper	$\frac{1}{2}$ drachm.
Syrup	1 ounce.
Distilled Water	15 ounces.

Mix the creasote with the acetic acid, gradually add the water, and lastly the syrup and spirit of juniper.

It will be seen on comparing the two formulæ that the Edinburgh Pharmacopœia ordered an ounce of a proof spirit of juniper, whilst the British Pharmacopœia orders only half a drachm; but then this half-drachm is made with rectified spirit, and contains nearly ninety-five times as much oil of juniper as the compound spirit of juniper of the last London Pharmacopœia.

The acetic acid ordered in the mist. creasoti with the intention of dissolving the creasote is entirely useless, as the quantity of creasote there ordered is perfectly soluble without the presence of acetic acid or any other solvent, and even if it were not so, the acid would be still useless in that small proportion, as the creasote is thrown down from it again on diluting it with the water. If the spirit of juniper has been ordered as a flavouring, and to cover the taste of the creasote, it is by no means the best that could have been chosen; it has the disadvantage of making the mixture milky at first, which, however, will become clearer on being allowed to stand for a day or two by the finely-precipitated oil of juniper coalescing and floating on the surface in the form of very small globules, besides which the mixture is rendered far more likely to disagree with the patient in the class of affections for which creasote is generally administered. For these reasons I suggest the following form, as, I think, a decided improvement:—

Creasote	16 minims.
Syrup of Orange Flower	2 ounces.
Distilled Water	14 ounces.

Mix the creasote with the syrup, then gradually add the water, shaking the mixture after each addition.

I herewith lay before Conference for it to pronounce its verdict upon them the following specimens of mist. creasoti:—No. 1, prepared according to the British Pharmacopœia; No. 2, prepared without acetic acid, but otherwise according to the British Pharmacopœia; No. 3, prepared according to the suggested formula.

It will be seen that the suggested formula contains the same amount of creasote as that of the British Pharmacopœia, that is, one minim to the fluid ounce, and I should here state, that without measuring it two drops will be found as near as can be equal to one minim. The creasote I used in these mixtures was a very fine specimen, prepared by Messrs. Morson and Son, and was exhibited at the late International Exhibition, so that it must have been prepared some three years and a half ago, and although prepared so long it has undergone but very little change in colour. The foreign and much cheaper creasote, or impure carbolic acid, should on no account be used for internal administration; it is of uncertain composition, usually obtained from coal-tar, and only about one-half the price of the creasote ordered in the Pharmacopœia.

In conclusion, I much regret that some member of Conference has not given us an able report on No. 115, or the creasote of commerce; it is a subject that requires a great deal of further investigation, as it is doubtful if any two samples of creasote are the same either in chemical composition or medicinal effect, and I must candidly acknowledge that I know of no reliable test for distinguishing them.

Wilton, near Salisbury, August 8, 1865.

In the discussion upon this paper, a member stated that he had found magnesia to increase the proportion of creasote taken up.

Mr. Reynolds said that in some experiments upon Calvert's carbolic acid, he found one part of the acid to dissolve conveniently in three parts of glycerine. He thought this might be an eligible method of treating creasote for internal administration.

Mr. Hollier thought that more information was needful before we could feel satisfied that the great difference in price between different samples of creasote was one that was warranted by any superiority in the higher-priced ones.

Mr. Tuck, in acknowledging a vote of thanks, said any credit in the matter was due to the Conference itself, since it had caused him to devote himself to these labours.

ON IPECACUANHA WINE.

BY MR. GEORGE JOHNSON.

What is the nature of the deposit in Ipecacuanha Wine, and how is it affected by the nature of the wine used? The investigation of this subject is one of great practical interest to pharmaceutists, for it has regard to a preparation which, while it is one of the most useful, and most used in the Pharmacopœia, is at the same time, in its present form, one of the least satisfactory of the galenical class of remedies. Chemical knowledge and skill have been extensively and usefully applied in devising formulæ for the preparation of very many medicines of this class, and in consequence they have been subjected to alteration and improvement in every new edition of the Pharmacopœia. The one which now engages our attention has, however, been passed by neglected, as being either so unimportant as not to merit attention, or already so perfect as not to need it. But practical daily acquaintance with it has convinced us that it is high time attention was paid to it. In order that we may more fully comprehend the nature of those changes in this preparation, which form the subject of the present paper, let us look at the composition of its parts. And first of ipecacuanha root.

The following is Pelletier's analysis of the cortical, which is the most active portion of the root.—

Emetina	16	parts
Volatile Oil	2	,,
Wax	6	,,
Gum	10	,,
Starch	42	,,
Woody Fibre	20	,,
Loss	4	,,
	100	

More recently, Willigk has discovered in ipecacuanha an acid, which he calls Ipecacuanhic Acid. It very much resembles gallic acid in its characters, so much so, as to have been mistaken by Pelletier for that acid. It is probably combined in the root with the emetina, which is the active principle, forming with it a salt, soluble to some extent in water, but more so in alcohol. It is this compound of ipecacuanhate of emetina to which ipecacuanha wine owes its medicinal activity, and which we are therefore interested in preserving from alteration or loss. The remaining constituents of the root need not occupy our attention, as they probably play no part in the change to which this preparation is subject.

Secondly, what is the composition of sherry wine?

It is pretty much the same as of all other grape wines, and in general it may be said to consist of bouquet or odorous principle, grape sugar, bitartrate of potash, tartaric, citric, malic, acetic, and carbonic acids, earthy salts, gum, alcohol, and water. All of these constituents are liable to variation as to quantity in different samples, according to the climate, species of vine, place of growth, and difference of manipulation in the various processes of manufacture. The most important points of difference, however, are the proportions of sugar, alcohol, vegetable acids, and acidulous salts which the wines contain, and these will therefore engage our attention in considering the subject we have in hand.

Sherry is not the only kind of wine on which I have experimented, but in order more fully to illustrate the subject, I have prepared a series of samples of ipecacuanha wine, with eight different wines derived from five different countries, viz. Spain, Sicily, Cape of Good Hope, France, and Germany, and the kinds of wine I have selected are Victoria Sherry, an excellent standard type of this kind of wine, Marsala, Cape Sherry, Cape Madeira, Chablis, Barsac, Hochheimer, and Niersteiner. (I may add they were all purchased from the European and Colonial Wine Company.) In addition to the samples prepared with the pure wines, are two other series made with the same wines, but one series containing in addition 10 per cent. of spirit of wine, 56 over-proof, added during the maceration, and the other containing 10 per cent. of spirit added after the filtration of the product. All the samples have been prepared six months, and were sealed as soon as they could be bottled (twenty or thirty specimens were here exhibited to the meeting). These were only parts of what I prepared, the remainders being in every case reserved for examination after being allowed to stand and deposit for four or five months.

This brings us to the first question stated in the list of subjects suggested for investigation by the Conference—What is the nature of the deposit in ipecacuanha wine? We are all familiar with the *appearance* of the deposit in our retail and dispensing bottles, and familiar too with the fact, that however bright the wine may be when the bottles are filled, it always has to be filtered once or twice before they are empty. The deposit is readily separable by filtration. Under the microscope, it is seen to consist in every case of two distinctly different substances mixed together, in proportions varying according to the nature of the wine which has been used. One of these is a yellowish, transparent, granular mass, totally destitute of any trace of crystallization, and presenting an appearance very like that of minute starch-granules; of this I shall speak again. The other is in large white well-formed prismatic crystals, evidently bitartrate of potash derived from wine. In most of the samples, the bitartrate was estimated to amount to as much as 50 per cent. of the whole deposit; in others, to not more than 20 per cent. The relative proportions of the two constituents of the deposit were not, in any case, determined by weighing, on account of the small quantity procurable.

On submitting it to chemical examination, the observed reactions proved that the deposit in every case, from whatever sample of wine the preparation had been made, was qualitatively identical. It was found to be insoluble or nearly so, with the exception of course of the bitartrate of potash. Alcohol partially dissolved it, and the portion insoluble in that menstruum, dissolved entirely in dilute hydrochloric acid. To obtain it in the form of solution for examination, it was treated with alcohol mixed with a few drops of strong hydrochloric acid. This dissolved all but the bitartrate of potash, and the solution gave the following reactions:—Being carefully neutralized with ammonia, tincture of galls produced in it the unmistakable grey-brown precipitate, tannate of emetina.

Solution of iodine produced a yellow precipitate, hydriodate of emetina. Excess of ammonia gave the ruddy-brown coloration characteristic of ipecacuanhic acid, when combined with alkalies. Tincture of sesquichloride of iron produced an olive-green coloration, and sometimes a precipitate of the same colour, ipecacuanhate of iron. Answering in a uniformly similar manner to these tests in every case, the deposit was found to consist of the only important ingredient in the ipecacuanha root or wine, viz. ipecacuanhate of emetina, but mixed in varying proportions with bitartrate of potash. It may be asked here—as the deposit is so uniformly identical in every sample prepared with whatever kind of wine, some influence, acting with equal uniformity, must be the cause of the deposit; what is that influence? The answer in my opinion is, oxygen acting upon and absorbed by the ipecacuanhic acid. Having arrived at this opinion only near the close of my investigation, I regret that I have not been able to determine the point by actual experiment, but in support of my opinion, I adduce the account of the chemical characteristics of ipecacuanhic acid, observed by its discoverer, Willigk, and given in the Pharmaceutical Journal, 1st series, vol. x., page 608.

"A solution of a persalt of iron is coloured green by even a very diluted solution of the pure acid; ammonia produces a violet colour; by an excess of ammonia the liquid becomes black like ink, and a blackish-brown sediment is formed in it. If a solution of the pure acid mixed with alkalies be exposed to the atmosphere, a dark blackish-brown coloration with absorption of oxygen is very soon perceptible. This tendency to absorb oxygen, although in a slighter degree, belongs to the pure acid as well as to its salts."

If, as is thus stated, ipecacuanhic acid absorbs oxygen when combined with ammonia, becomes insoluble, and carries down the ammonia with it, there seems fair reason for the presumption that it would do so when combined with a far weaker base, viz. emetina. This *à priori* reasoning is borne out by the investigation which I have described, and I therefore conclude that the deposit in ipecacuanha wine, in addition to the bitartrate of potash, is emetina combined with ipecacuanhic acid, which has been to some extent altered by absorption of oxygen.

With regard to the second question, viz. "How is the deposit affected by the nature of the wine used?" I reply, only as regards its amount and the proportion in it of bitartrate of potash. As I before stated, the samples were prepared with eight different kinds of wine, and there is a palpable difference between them in the amount of deposit they contain, which fact is accounted for by another, viz. that there is as great a difference between them in the proportion of their principal constituents, viz. sugar, alcohol, and vegetable acids. I have quantitatively examined all these samples of wines, with a view to ascertain the percentage in them of the two last substances; this is the result:—

Name of Wine.	Quantity of free vegetable acid in 1 pint, and its percentage.		Quantity of alcohol in Oi, and its percentage.		Amount of deposit, No. 1 containing most.
	Grains in Oi.	Percentage.	Sp. grav. ·825		
Marsala . . .	44·	·502	f℥iii ʒvii or	19·40	1
Cape Madeira .	47·2	·540	f℥iv ʒss or	20·3	2
Cape Sherry . .	33·040	·377	f℥iv ʒi ♏xvi or	20·79	3
Victoria Sherry .	33·040	·377	f℥iv ʒi ♏xl or	22·0	4
Barsac	not determined.		f℥i ʒvij or	9·45	5
Niersteiner . .	59·760	·671	f℥iss or	7·5	6
Hochheimer . .	66·0	·754	f℥i ʒi ♏xl or	6·0	7
Chablis	53·660	·613	f℥ij ʒv or	13·12	8

It will be observed on inspecting the samples, that the largest amount of deposit is contained in those samples prepared with the wines of Sicily, Spain, and the Cape of Good Hope, while in the samples prepared with the wines of France and Germany, the deposit is conspicuously smaller. On referring to the table of percentages of alcohol and acids or acidulous salts for a clue to the cause of this notable difference, we are struck by the fact that the former contain a large proportion of alcohol, but are deficient in vegetable acids, while in the latter the acids predominate and the proportion of alcohol is comparatively small. But as these latter wines containing much acid and little alcohol are those in which there is least deposit, it follows, as a practical conclusion, that such wines are much better adapted for the preparation of the ipecacuanha wine, than the sherry ordered in the Pharmacopœia, or the substitutes which are commonly employed for the purpose, however great their alcoholic strength.

But not only does the nature of the wine affect the *quantity* of the deposit, it also determines the proportions of its component parts. If wine were a mere mixture of spirit and water, even then there would be a deposit from a tincture of ipecacuanha made with it, arising from the absorption of oxygen before mentioned. I have prepared such a sample of the same proportions of root and solvent as the officinal wine, but containing 54 per cent. of alcohol, sp. gr. ·825, in other words, proof spirit. It will be seen by this sample, that the mere increase of the proportion of alcohol up to this point, at any rate, does not suffice to prevent the deposit, which in this case is simply ipecacuanhate of emetina.

But wine contains also bitartrate of potash in solution, and this is found to be deposited with the ipecacuanhate of emetina. In most wines a portion of the grape sugar contained in the grape juice is left unfermented, that it may communicate an agreeable sweetness to the beverage. Although, for this purpose, the fermentation is nominally stopped when the wine is finished and bottled, this process goes on steadily and continuously, though it may be slowly, as long as any sugar remains unconsumed. The quantity of alcohol in the wine thus gradually increases, and the bitartrate of potash being insoluble in alcohol is gradually deposited; and I venture to assert, that by the loss of this ingredient, the wine is to the same extent rendered incapable of retaining in solution the active principle of ipecacuanha it previously may have contained. I have shown before that alcohol, though existing in large proportion in any given tincture of ipecacuanha, is not of itself able to prevent the deposit of emetina, etc.; and I now beg your attention to another tincture of ipecacuanha, prepared with a mixture of rectified spirit and water, containing only 20 per cent. of the former, but containing also four grains of tartaric acid to the fluid ounce, as another evidence of the power of acids even in a wine or tincture of little alcoholic strength, to retain the active principle in solution for a long, if not an unlimited period. You will see by inspecting the sample that it contains, if any, a very small amount of deposit compared with the tincture containing only spirit and water.

As there may have been in the minds of many pharmaceutists doubts concerning the nature of the deposit in ipecacuanha wine, I trust my experiments may conduce in some measure to produce clearer views on the subject, and as we know the preparation in question to be an unsatisfactory one, that they may tend to its improvement.

Mr. S. U. Jones expressed his interest in the valuable paper just read. Personally, he found that a pale sherry gave him good results. Until sanctioned by the Pharmacopœia, of course the addition of tartaric acid would be improper.

Mr. Brady said, that the author's opinions as to the necessity of a free acid, were confirmed by the favourable opinion in which acetum ipecacuanhæ was held in many parts of the country. The syrup. ipecac., P.E., was also a very eligible preparation.

Mr. Dymond alluded to an oxymel ipecac., which was a satisfactory preparation.

Mr. Lucas confirmed the statements of the author as to the large amount of deposit given by a proof-spirit tincture of the drug.

Mr. Schacht queried whether it had been shown how oxidation affected the question. That the withdrawal of bitartrate of potash from solution did so, had been lucidly shown by the author.

Other members took part in the discussion, and a general satisfaction was expressed that one of the Birmingham members had thrown so much light upon a subject, that had received but little from previous investigators, who had concluded that the deposit was inert vegetable matter, as mucilaginous principles, ulmine, etc.

(*End of the First Day's Sittings.*)

SECOND SITTING.

Wednesday, September 6th, 10 A.M.

ON MICROSCOPIC ANALYSIS APPLIED TO PHARMACY.

BY H. DEANE, F.L.S., AND H. B. BRADY, F.L.S.

On the Microscopic Examination of Opiates.—Continued Report of Progress.

Since we had the pleasure, a year ago, of offering a preliminary report on the microscopical examination of some of the preparations of Opium, we have worked almost continuously in the same line of inquiry, with a view of presenting to this Meeting an outline of the whole subject, as complete as might be in our power to make it. But, instead of our investigations narrowing, as might have been expected, towards natural and obvious conclusions, they appear rather to have led us into a wider and wider field. We find it therefore necessary to withhold, for the present, any final report, and propose only to give an outline of the form and course our investigation have taken, and to take the opportunity of correcting a few inaccuracies which, unawares, had crept into our first paper. We may add, as a further reason for delay, that a friend, who is at present experimenting on an extensive scale with the opium alkaloids, has proposed to incorporate his results with our own at a future time.

It is our first duty to draw attention to the errors above alluded to. These are chiefly in connection with the proportion of the various alkaloids existing in opium. Relying on the statements contained in Pereira's 'Materia Medica,' we accepted the apparently careful analyses of opium therein detailed, on the authority of Mulder's analyses, which we now believe to be of questionable accuracy. We have recently been favoured by Messrs. T. and H. Smith, of Edinburgh, with the actual results obtained in working up large quantities of Turkey opium; and whilst, at present, we abstain from any expression of opinion on such still debated points as the existence and influence of thebolactic acid, we are ready to adopt the proportions set down in their table as the most reliable with which we are acquainted. From 100 parts of fine opium Messrs. Smith have obtained as follows:—

Morphia	10·
Narcotine	6·
Thebaine	0·15
Papaverine	1·
Meconine	0·01
Meconic Acid	4·
Thebolactic Acid	1·25
Codeia	0·3
Narceine	0·02

It will be seen, on comparing these figures with those given by Mulder, that the discrepancies are quite sufficient to vitiate deductions which might have been drawn from his statements; but the only point in which we have been seriously misled is in the altered importance of *narceine* as a constituent of opium. An average of Mulder's analyses gives about 8 per cent. of this alkaloid, or nearly one-twelfth of the weight of the crude drug, whilst the more recent table sets down the amount as only one five-thousandth. We must take our choice between two alternatives, and assume *either* that the character of the opiums experimented on must have been widely different, *or* that the narceine of Mulder is not the alkaloid known under the name at the present time. There appears still to be some uncertainty hanging about this peculiar principle; and very recent researches lead to the belief that there are two distinct substances of the same composition and physical characters, but with different reactions, procured from opium by the same process, and associated under the same name; but even this does not account for the figures given by Mulder, as the two substances probably do not coexist in the same opium, and the proportion in which they occur is the almost infinitesimal one given by Messrs. T. and H. Smith. From Pereira we also gather that narceine, *i. e.* we suppose the narceine of Mulder, is an inert substance; but narceine, as now understoed, is regarded on the Continent as superior to morphia in its sedative effects; and the whole quantity that can be produced by the English morphia makers is eagerly taken up for the German market at many times the price of the latter alkaloid.

Assuming the proportions now indicated to represent correctly the crystalline organic constituents of Turkey opium, it is obviously a useless refinement to pretend to recognize, by the microscope, constituents existing to so small an extent as thebaine, meconine, and narceine, in the extracts of any opium preparation; and, indeed, it can only be under peculiarly favourable circumstances that we can even expect to have the presence of papaverine and codeine manifested in any striking manner. If we eliminate these five principles, as we propose to do, from our future investigations, our labour will be much simplified, and be confined chiefly to the evidences of the presence of morphia and narcotine as *bases*, and to salts of meconic and thebolactic acids. As yet we have had no opportunity of studying this latter substance, or the compounds which it enters into, but through the kindness of the gentlemen before referred to, we are able to place before you specimens not only of thebolactic acid itself, but of many of the thebolactates. If we may judge from the marked crystalline characters of the thebolactate of morphia, it seems probable that we may gain, by a study of the physical peculiarities of the compounds into which this acid enters, much assistance in the investigation of the crystalline precipitate observable in opium extracts.

The other discrepancies between the two analyses we have referred to, are, in respect to some of the principles considerable, yet will not, we think, seriously affect the deductions we have already made.

The only other misstatements which, so far as we know, occur in our former paper, are in connection with the presence of substances, which can scarcely be said to be proper to opium. The large crystals which appear in the extracts of the various Indian opiums, and which were attributed to the existence of large quantities of codeia, seem probably to be due rather to certain adulterants which we have since learned, through our friend Dr. Riddell, are extensively employed on the Indian continent. It is not impossible that the jaggery, or palm sugar, which is used in this way, may have much to do with their presence, though we still believe the larger proportion of codeia, which we then assigned to the Patna variety, to be correct in point of fact.

We have found it necessary to adopt some precautions against the inaccuracies which are liable to accrue from the varying proportions of inorganic constituents, and are satisfied that the quantity of earthy salts contained in opium is commonly much underrated.

In a field so new and untried it would be unreasonable to expect results entirely free from error, and, notwithstanding the observations we have been compelled to place at the beginning of this paper, we retain the conviction, unaltered, that with a little practice the microscope affords a ready means of judging the qualities of preparations of opium, and even of affording indications of the nature of the solvents, and the process of manufacture which has been employed.

We may now proceed to indicate the points to which our attention has been directed in our recent experiments. Several officinal preparations previously omitted have been worked out in a similar manner to those of which we have already furnished the results. We may instance, vin. opii, ext. opii liquidum, B.P., tinct. opii ammoniata, Ph. Ed., as having yielded interesting facts, which at a future time we hope to lay before the Conference. We might just caution any of our members, who are so far interested in the subject as to repeat our experiments, that it is necessary in making any microscopical observations on vinous solutions, in the first place to examine the extractive matter of the sherry wine he has employed, as a crystalline precipitate variable in quantity and character, probably consisting of bitartrate of potash and grape sugar, commonly presents itself upon evaporation, and though this does not greatly interfere with the evidences of opium crystals, it is necessary to be familiar with its appearance.

With respect to the extract. opii liquid. of the new Pharmacopœia, though it can scarcely be said to represent Battley's Liquor Opii Sedativus, as it was probably intended that it should, it seems to be as near an approximation to a satisfactory aqueous solution of opium as is compatible with simplicity in formula.

We have had the opportunity, through the kindness of Dr. Riddell, late of the Indian army, and of Mr. Morson, of making a series of experiments on reliable specimens of several opiums not usually met with in commerce, with each of which we have adopted the same course as laid down in our former paper. These are Benares cultivation opium, that is, the drug as it leaves the hands of the growers; Benares provision opium, that is, the drug as approved by the Indian medical authorities, and accepted for hospital opium; Egyptian opium, and English opium. But it would be of little use offering any remarks on the different microscopical appearances presented by them until we are prepared to illustrate our meaning by drawings.

A third course of experiments has been made, with a view to determine the different solvent powers of alcohols of various strengths, of methylic alcohol, and of methylated spirit, with the most striking and instructive results. At present we need only say, that our observations confirm the views of medical men, namely, that methylated tincture of opium is a strikingly different solution to the officinal tincture, and it seems a question whether it ought to be in any case admitted even for external application.

A fourth series of investigations has been made on what we may term synthetical opiums,—that is to say, upon masses of neutral extractive matter, with which the alkaloids existing in opium have been incorporated in similar proportions to those in which they exist in the crude drug, the object being to have a sort of artificial opium of known composition to act as a normal standard, with which results obtained from the various samples upon which we have worked might be compared. The great difficulty which we have had to encounter has been to obtain a perfectly neutral extractiform basis as a medium, and we have not yet succeeded to our satisfaction, but we still hope to obtain valuable corroborative evidence by this or some similar process.

Such is the outline of the works we have been engaged upon in connection with the purely scientific portion of our subject; but it may not be considered amiss in a company of practical pharmaceutists to say a few words on the application of the facts which have been established, especially concerning the points which should be held in view in preparing solutions of opium for medicinal use.

For most purposes the tincture of opium of the Pharmacopœia leaves the physician little to desire, inasmuch as the astringent and other constitutional effects bring with them no ill consequences; but there are still a large number of cases in which individual peculiarity or untoward symptoms forbid the use either of opium itself or of its tincture, and in these a solution, containing the sedative principle, free from the stimulating properties of narcotine, and the irritating effects of the oleo-resin, becomes a desideratum, and we offer the following formula as likely to supply these requirements. Though there may be some drawbacks to its use in the necessarily tedious mode of preparation, we can, through the kindness of several medical friends, who have used the preparation largely, speak with confidence of its medicinal efficiency.

Purified Tincture of Opium. (*Strength of P.L.* 1851.)

℞	Dried Opium	96 oz. (tr.)
	Sp. Vini Rect.	2 gall.
	Distilled Water . . .	q. s. to make 8 gall. of Tincture.

Exhaust the opium with cold distilled water, evaporate the solution to the consistence of soft extract, and redissolve in four gallons of distilled water. Set this solution aside for a few hours, until all feculence has subsided, then filter, and again evaporate to the consistence of treacle, and add carefully and gradually the whole of the spirit. When the gummy matter has perfectly subsided, pour off, and add as much distilled water as will cause the whole to measure exactly eight gallons.

Mr. Stoddart had some acquaintance with experiments that had been made with codeia by the medical officers of lunatic asylums, and in the cases to which he referred it had not been found to act as an efficient sedative. It seemed as if no preparation of opium gave universal satisfaction, probably arising partly from idiosyncrasies of patients.

A Member referring to the opiate known as "Nepenthe," said it was probably a solution of citrate of "opium" in sherry wine; the opinions respecting it differed widely.

Mr. Heathfield considered that the great peculiarity of Battley's preparation was the absence of the volatile principles contained in crude opium. Undoubtedly a very large amount of common water was used in its preparation, and the subsequent evaporation of this would introduce its salts into the preparation—a fact to be recollected in any micro-chemical researches. The extractum opii liquidum of the British Pharmacopœia would have borne a close resemblance to Battley's solution if the process had been carried further.

Mr. Dymond thought that there was much greater uncertainty in the composition of crude opium than was generally supposed. He had lately met with some opium of the highest price which did not yield more than five per cent. of morphia. A peculiarity of Battley's preparation was that it was compatible with Liquor Potassæ, which precipitated ext. opii liq., B.P.

Mr. Heathfield remarked, that as Battley's solution contained 25 per cent. of spirit, that might redissolve the precipitate.

Mr Thonger stated that bad imitations of Battley's solution occasionally found their way into the market.

NOTES ON A COMMERCIAL SAMPLE OF SULPHATE OF QUININE.

BY W. W. STODDART, F.G.S., BRISTOL.

In July last I received a sample of sulphate of quinine from Dr. Attfield, which was forwarded for the inspection of the adulteration committee, and a report requested. The name of the manufacturer, as stated on the label, was Auguste Thil, at Paris. I could get no information from any of the leading drug-houses in London, in answer to inquiries respecting its commercial relation and importation, nor could I obtain an original bottle till a friend bought one for me from a druggist at Cardiff. As far as I can ascertain, it is principally sold for the use of shippers and surgeons, and, as an inducement to the purchaser, is offered at a low price. In external appearance it differs much from a pure article, such as Howard's or Pelletier's. It is not so distinctly crystallized, and is more silky. It is much more soluble in diluted sulphuric acid than the genuine salt. It is not discoloured by strong nitric or sulphuric acids, showing the absence of phloridzine or salicine.

An aqueous solution of chlorine and ammonia failed to give the green tinge so characteristic of quinine. Nitrate of silver and nitric acid gave a white curdy precipitate of chloride of silver. Chloride of barium and hydrochloric acid also gave a dense precipitate of sulphate. The next test applied was that of Dr. Herapath.

Ten grains of the suspected salt, treated in the usual way, only afforded one or two very minute crystals of iodosulphate,—a quantity too small to be weighed. I then tried the sulphocyanide test described by me at our last year's meeting. The resulting precipitate, under a quarter-inch lens, showed abundance of large massive crystals of sulphocyanide of cinchonine interspersed with the well-known tufts of sulphocyanide of quinidine, but none of the long acicular crystals of the quinine salt. When dissolved in water, to the extent of a scruple to the ounce, hardly any fluorescence was perceptible to the naked eye in daylight. Even the spark of a powerful Ruhmkorff's coil gave only a faint fluorescent light, which is so intense and beautiful in a solution of quinine, even when containing only the one-fourth of a grain per cent. My modification of Liebig's test was most decisive, and corroborated the above results in the most marked manner.

I cannot proceed without passing a vote of censure against the British Pharmacopœia text. The amount of water is very prejudicial to its usefulness, nor is there any rule given for the quantity of ammonia to be used, and the student will find to his vexation that, as the quantity of ammonia used differs, so will the amount of precipitate vary also. Another thing worthy of remark is, that the presence of cinchonine modifies and almost entirely masks the iodine and sulphocyanide tests for quinine. I could not get the herapathites to crystallize, or the sulphocyanides to deposit, till I had separated the quinine by ether. If I had not therefore been aware of this, I should have put down this specimen of quinine to have had none at all in it of the true alkaloid.

The best use to make of the Pharmacopœia method of testing is to correct any previous observation by a synthetical examination, for either of or any mixture of the three alkaloids, when treated *exactly* alike, show a marked distinction in their general appearance when too much ammonia is not employed. A quantitative analysis gave 41·3 per cent. of cinchonine, which would be equivalent to 36·31 of the sulphate, the remainder being quinidine and quinine,—the latter forming about ten per cent. of the whole, and probably a mixture of hydrochlorates and sulphates.

From the foregoing experiments it is evident that the so-called sulphate of quinine is nothing of the kind, but a mixture of cinchonine and quinidine, with only a tenth of quinine. In short, it is truly what the label ironically states, a "fabrique spéciale," which it is the duty of the adulteration committee to expose, and certainly not proper for a druggist to sell as pure sulphate of quinine. On the other hand, it is very pleasing to find that such an article could not readily be procured from our well-known wholesale London houses. It proves the truth of what I affirmed at Bath, that it is the druggist's own fault if he does not get a genuine article.

Mr. J. WATTS also had found that if much quinidine or cinchonine were present the action of sulphocyanide of potassium upon quinine was masked. He had experimented with other precipitants, and found tartrate of potash to answer very well, though further experiments were desirable before accepting the process.

REPORT ON THE PROCESSES FOR THE PREPARATION OF GLACIAL ACETIC ACID.

BY MR. W. E. HEATHFIELD.

It is well known that the principal source of acetic acid is wood, which, when subjected to destructive distillation in closed iron vessels, yields, by the re-arrangement and combination of its elements, a plentiful supply, amongst many other products; by this operation a large proportion of acetic acid, whether for use in the arts, for culinary purposes, or in the practice of medicine, is now manufactured. The early process of carbonizing split blocks in iron retorts has scarcely been deviated from, and although a more recent mode of producing it during the conversion of sawdust into charcoal has been attempted, it has scarcely been found, generally, sufficiently remunerative to justify its continued prosecution.

The crude acetic acid, obtained by the before-mentioned operation, when saturated with lime produces an acetate of lime, which, when decomposed by means of sulphate of soda, furnishes acetate of soda, the salt commonly made use of for the manufacture of acetic acid, whether officinal or glacial.

The officinal acetic acid of the British Pharmacopœia is required to be of the specific gravity of 1·044, and is said to contain 28 per cent. of anhydrous acid, equal to about 33 per cent. of the monohydrated or glacial acid, one drachm requiring 31·5 measures of the volumetric solution of soda for saturation.

The officinal acid of the United States Pharmacopœia is required to be of the specific gravity of 1·041, and is said to contain in each 100 parts 36 parts of monohydrated acid, equal to about 30½ per cent. of anhydrous acid, but this is declared to be a less satisfactory assurance of its strength than its saturating power, which is such that 100 grains ought to saturate 60 grains of crystals of bicarbonate of potash, indicating about 30½ per cent. of anhydrous acetic acid.

The monohydrated or glacial acetic acid, being a hydrate of acetic acid, or $C_4H_3O_3HO$, has been produced under the auspices of various promoters; that principally followed in this country for some years having been as follows:—

One ton of purified acetate of soda was fused in an iron pot until it assumed a perfectly tranquil appearance; on being poured off, the cooled mass weighed 11½ cwt. One cwt. of this mass being broken up was digested with 60 lb. of sulphuric acid, of specific gravity 1·848, and was then subjected in a still to the requisite heat for the entire distillation of the acetic acid. This product was redistilled with a portion of peroxide of manganese, in a chloride of calcium or an oil bath, and the product was finally distilled from charcoal and peroxide of lead. At this point the acid was obtained of great purity, and being placed in ice, the greater portion of it solidified, and the fluid part being poured off, glacial acetic acid remained of about specific gravity 1·067, containing nearly 98 per cent. of monohydrated acid, or 85 per cent. of anhydrous acid; this acid was colourless, volatile, highly caustic, a solvent of camphor, resins, essential oils, its vapour burning with a blue colour, and of considerable inflammability.

The process of the British Pharmacopœia for the production of monohydrated acetic acid is somewhat similar, saving that the proportion of sulphuric acid directed to be used is larger, being nearly twice the quantity. The specific gravity is required to be 1·065, 1 drachm requiring 97 measures of volumetric solution of soda for complete neutralization. Some minor details of manipulation are omitted in this formula.

The monohydrated acid of the United States Pharmacopœia is prepared in a manner somewhat corresponding,—one equivalent of fused acetate of soda, with two equivalents of sulphuric acid, being the proportions demanded.

The Prussian and Hanoverian Pharmacopœias are the same in effect, but the process is slightly different, being performed by the agency of acid sulphate of potash and acetate of soda, subjected to distillation, the specific gravity of the acid procured being from 1058 to 1060. But the process of M. Melsens is that which is now adopted on some parts of the Continent, and it appears to be convenient for the preparation of the monohydrated acid on a large scale. Melsens observed that when acetate of potash is supersaturated with acetic acid of moderate dilution, and evaporation allowed to take place, an acid-salt was the result, and that this on cooling became solid and crystalline; at a temperature of 248° F. *in vacuo* this salt does not part with its acid; at 300° it begins to boil, evolving vapours of crystalline acetic acid, and at 572° neutral acetate of potash remains in the retort, being decomposed on raising the temperature. This neutral salt combines with fresh dilute acid; the salt fixes a part of the acid, whilst another portion more dilute passes over in distillation. As the acid increases in concentration, a point is attained when the distilling product solidifies, but the temperature should be kept low.

Whatever circumstances may have appeared to justify the estimation of the strength of acetic acid from its specific gravity, it is most fallacious,—a mere waste of time to adopt it. No reliable determination is given by such a mode, and it was long ago observed that the density of mixtures of the strongest acetic acid and water were, at a certain point, greater than that of the acid itself, and even in the commercial acid Mr. O'Neil observed that one sample, marking 6 of Twaddell, corresponding to specific gravity 1·030, and which should contain 22 per cent of real acid, was as good as another sample marked 9 of Twaddell, corresponding to specific gravity 1·049, and which should contain 38 per cent. of real acid,—both these samples being free from impurity. In other cases Mr. O'Neil observed that the contrary was the case.

So anomalous is the state of matters with regard to this acid, that no approach can even be made to correctness by taking the specific gravity of the stronger acid; for whilst the specific gravity of the monohydrated acid is regarded as about 1·063, and should contain 100 per cent. of aqueous acid, the same acid may be diluted with five atoms of water, or $51\frac{1}{2}$ per cent., and yet possess the same specific gravity of 1·063. Thus an acid containing one atom of water has a like specific gravity with one containing six atoms of water. Dr. Ure pointed out that a curious analogy exists in this respect with nitric acid, which suffers the greatest degree of condensation when one atom of the real acid is diluted with seven atoms of water.

The following Table exhibits some of the relations of specific gravity to strength of acetic acid:—

An acid	containing	100	per cent.	monohydrated acid	is	of sp. gr.	1·063.
,,	,,	95	,,	,,	,,	,,	1·070.
,,	,,	90	,,	,,	,,	,,	1·073.
,,	,,	85	,,	,,	,,	,,	1·073.
,,	,,	80	,,	,,	,,	,,	1·073.
,,	,,	75	,,	,,	,,	,,	1·072.
,,	,,	70	,,	,,	,,	,,	1·070.
,,	,,	65	,,	,,	,,	,,	1·068.

An acid	containing	60	per cent.	monohydrated	acid	is of sp. gr.	1·067.
,,	,,	55	,,	,,	,,	,,	1.064.
,,	,,	50	,,	,,	,,	,,	1·060.
,,	,,	45	,,	,,	,,	,,	1·055.
,,	,,	40	,,	,,	,,	,,	1·051.
,,	,,	35	,,	,,	,,	,,	1·046.
,,	,,	30	,,	,,	,,	,,	1·040.
,,	,,	25	,,	,,	,,	,,	1·034.
,,	,,	20	,,	,,	,,	,,	1·027.
,,	,,	10	,,	,,	,,	,,	1·016.
,,	,,	5	,,	,,	,,	,,	1·007.

Thus an acid of about 80 per cent. has the highest specific gravity, but between 90 and 75 per cent. there is but little variation.

Molleret found that 100 parts of glacial acid of sp. gr. 1·062 formed, with 32·25 parts water, a mixture of the density of 1079, and with 112·2 parts water a mixture whose density is the same as that of the acid itself, viz. 1063.

Thus we are called upon for a more definite means of determining the strength of this acid than that of specific gravity, and in ordinary examinations the volumetric method with caustic soda is adequate for the purpose. It is certainly open to the objection, that neutral acetates bear an alkaline reaction on litmus, but with care this mode of testing is little liable to any serious source of error. Dr. Ure made use of ammonia, and thought most highly of the accuracy of his process. Dr. Mohr suggests the use of carbonate of baryta or lime, and the determination by this means is considered most reliable. Mr. C. G. Williams recommends a standard solution of lime syrup, which seems to be a ready means of estimation. In a report by Mr. John Baker, in the Pharm. Trans. for October, 1844, he exhibits great accuracy in estimations of this acid by means of carbonate of soda, and I can confirm the results of his experiments with this salt. In the United States Pharmacopœia bicarbonate of potass is recommended, and although any salt containing carbonic acid is somewhat open to objection for estimating acetic acid, this latter salt is perhaps the least so.

Next to the method proposed by Melsens, that of the Pharmacopœia is the most easy of adoption. No process hitherto suggested will secure a product of uniformity without some details requiring attention being followed, and no operation hitherto suggested has produced an acid of determinate strength without subsequent separation of the stronger from the weaker portions. In the present state of our experience we may be satisfied to follow the rule laid down for its production, taking care that the estimation of its strength, by whatever means attempted, be free from the sources of error pointed out. We can well afford to dismiss the taking of its specific gravity, and although the solidification of it at certain temperatures assists us in forming an opinion of its strength, it is too conspicuous a standard of comparison on which to lay much stress. To its saturating power, in one form or another, we are at present compelled to resort.

The PRESIDENT, after referring to the fulness of detail which characterized Mr. Heathfield's monograph, stated that the estimation of the strength of acetic acid had received his attention, and he had found that the best results were obtained by saturating the acid with carbonate of baryta.

Mr. T. B. GROVES thought that the process of the Dublin Pharmacopœia, in which anhydrous acetate of lead and hydrochloric acid were used, answered well.

Mr. HEATHFIELD replied that the chance of getting traces of chlorine was an objection to this plan. At present, nearly all the acid sold here was imported from the Continent, and there was every reason to believe that it was made by Melsens' process. Its properties with regard to solidification were singular, and apparently capricious. An acid, after being melted, would refuse to congeal again until much below temperatures at which it had previously remained solid.

Dr. Attfield referred to some analogous cases, especially that of a saturated solution of sulphate of soda.

Dr. Parkinson said that the laws of heat in connection with change of state, from solid to liquid and the converse, would account for the phenomena alluded to.

ON THE STRENGTH OF SOLUTIONS OF PHOSPHORIC ACID OF VARIOUS DENSITIES.

BY MR. JOHN WATTS,

SENIOR BELL SCHOLAR IN THE LABORATORIES OF THE PHARMACEUTICAL SOCIETY.

The utility of a table which shows at a glance the percentage strength of a solution whose specific gravity is known, will at once, I think, be admitted by all. The force of this is shown by the fact, that many years ago, MM. Bineau and Otto compiled the first table of the kind,—sulphuric acid being the substance operated upon; this was soon afterwards followed by nitric and hydrochloric acids by Dr. Ure; and still more recently by another for ammonia. The other alkalies, potash and soda, have also been tabulated by Dalton and Fünnermann; acetic acid by Dr. Mohr; and alcohol by Fownes. These, I believe, are all which, up to the present time, have been so worked upon.

Knowing the great advantage such tables present to the practical chemist, more particularly in saving of time and labour, I undertook, as a subject for the Pharmaceutical Conference, to compile a table of phosphoric acid, so as to exhibit at once the relation between its density and its strength. . . . Although a table for phosphoric acid is not so indispensable as one for sulphuric or nitric acids, its use in the arts and manufactures being much more limited, still phosphoric acid is coming into much greater use, at least in medicine, and any one who has had the work of making the "Syrup of Phosphates" which are now so fashionable, knows the advantage accruing from the possession of a ready means of obtaining a knowledge of the strength of his solution.

In the compilation of a table of this kind, the first thing is to know at what specific gravity to start; accordingly, finding that a thick syrupy acid of 1·5 sp. gr. contained nearly 50 per cent. real PO_5, I made that the starting-point, and proceeded regularly downwards as far as sp. gr. 1·006. The interval between these two numbers contains 47 sp. gravities, therefore 49 in all, and as each sp. gr. was analysed at least three times, in order to obtain a correct mean, it entailed the work of about 150 analyses. The table, when completed, stands as follows:—

Specific Gravity.	Percentage.	Specific Gravity.	Percentage.	Specific Gravity.	Percentage.	Specific Gravity.	Percentage.	Specific Gravity.	Percentage.
1·508	49·60	1·392	40·86	1·293	32·71	1·185	22·07	1·081	10·44*
1·492	48·41	1·384	40·12	1·285	31·94	1·173	20·91	1·073	9·53
1·476	47·10	1·376	39·66	1·276	31·03	1·162	19·73	1·066	8·62
1·464	45·63	1·369	39·21	1·268	30·13	1·153	18·81	1·056	7·39
1·453	45·38	1·356	38·00	1·257	29·16	1·144	17·89	1·047	6·17
1·442	44·13	1·347	37·37	1·247	28·24	1·136	16·95	1·031	4·15
1·434	43·95	1·339	36·74	1·236	27·30	1·124	15·64	1·022	3·03
1·426	43·28	1·328	36·15	1·226	26·36	1·113	14·33	1·014	1·91
1·418	42·61	1·315	34·82	1·211	24·79	1·109	13·25	1·006	·79
1·401	41·60	1·302	33·49	1·197	23·23	1·095	12·18		

* British Pharmacopœia.

I would next notice the method employed for its analysis. After essaying and testing the various advantages of a great many different processes, of which I will speak hereafter, I came to the conclusion, that with a pure solution of phosphoric acid, no method is more simple, more accurate, or less liable to error, than the method employed in the Br. Ph., viz. "the evaporation down of a weighed quantity of the solution, with a known excess of pure protoxide of lead."

I confess I was somewhat disappointed when first employing this method, owing to the discordant results obtained, notwithstanding that at first sight it seems exceedingly straightforward and plain; but I afterwards found it entirely arose from not operating with *pure* oxide. I had used the commercial article, and though previous to each analysis it had been carefully ignited, there nevertheless remained so much carbonate and other impurities, as to render it practically worthless, no two results agreeing nearer than 2 or 3 per cent.

Finding this to be the case, I looked about for some other substance to use instead, and for this purpose tried the oxide of zinc. Analysis with this latter oxide gave perfectly accurate results as regards numbers, but was, however, open to a great objection, inasmuch as the phosphate of zinc readily fuses, and upon ignition towards the end of the analysis to get rid of the last traces of water, the phosphate fusing, and adhering tenaciously to the bottom of the crucible, from which it cannot be subsequently removed, entirely spoils the vessel for a second operation. Oxide of magnesia answered no better, for this, unlike the oxides of lead and zinc, forms a hydrate when put into water; and, as is the case with many magnesia salts, either the last traces of this water of hydration, or the atom of basic water assimilated when neutralizing the PO_5 is so difficult to totally expel, even after powerful ignition, that one can never be certain that the whole of the water is driven off unless the capsule has been allowed to cool and re-ignited several times, which, with such a number of similar analyses, causes much unnecessary trouble. I tried also the volumetric nitrate of uranium process, but as the results never approach nearer than five to six per cent., a discrepancy too great to be allowed in a case like this, it was given up. Determined then to revert again to oxide of lead, and to prepare a pure oxide myself, I took red lead ($2PbO+PbO_2$), and dissolving out the protoxide with dilute nitric acid, washed well the resulting binoxide; this, by careful ignition over an air flame, loses its extra oxygen atom, and passes with incandescence to the state of protoxide. Working with oxide prepared in this manner I obtained highly satisfactory results, and subsequently used this method only for the completion of the analysis of the table. By examining the gradation of the numbers on the table, we see that the percentage increases or decreases regularly according as the specific gravity rises or falls, proving that the strength can be correctly deduced from a knowledge of its density, and that, unlike acetic acid, it presents no anomaly in this respect; also, that when a strong acid is diluted with water, though a considerable quantity of heat is evolved, no condensation in volume follows. The correctness of the numbers may be also somewhat checked in the following manner:—Take 100 *fluid* grains of 1·508 acid, this will weigh 150·8 grs., and contain 74·79 grs. by weight of PO_5; dilute this with 100 fl. grs. of water, the whole will weigh 250·8 grs., and contain 74·79 grs. by weight of PO_5; each 100 parts by weight will be therefore of sp. gr. 1·254, and contain theoretically 29·7 parts by weight of acid; by referring to the latter sp. gr. on the table we find by experiment such number to contain 29·16 per cent. Again, 100 fl. grs. of acid 1·285 sp. gr. will weigh 128·5 grs., and contain 41·03 grs. by weight of PO_5; diluted with 100 fl. grs. of water, will weigh 228·5 grs., and contain 41·03 grs. of acid, being of sp. gr. 1·142; each 100 parts of this sp. gr. should contain then 17·9 by weight of PO_5. Reference to the table shows us 17·89 per cent. I have checked a great many numbers in this manner, and they all come correct.

The temperature at which all the specific gravities were taken was 15·5 C. (60° Fahr.). This is, of course, an important point in using the table, as the volume of liquid varies considerably according to the temperature; and as at different heights of the thermometer comparison of volumes no longer holds good, consequently comparison of percentages would be equally fallacious.

Very little more remains to be said, as this is not a comprehensive subject which requires much dwelling upon. I might add that the acid used was prepared from common phosphorus in the ordinary manner; but I have since made several samples of acid from amorphous phosphorus as first mentioned by Mr. Groves, and decidedly prefer this latter method; the phosphorus is readily acted upon, entails no danger in the process, and a product is obtained in a few hours which ordinarily would take as many days. One little objection appeared, which is apt to make one think that the product is not absolutely pure, viz. that in the concentrated state it was more or less coloured, possessing a brownish or yellow tint; this might have arisen from the particular specimen of amorphous phosphorus operated on: probably another sample would not show this defect.

Lastly, I think I have shown, as far as practicable, the corrections of the table in question; and I know this, that in quantitative analysis generally, and more especially when work is published for the use or guidance of others, as in the present instance, it behoves me to accept only thoroughly-substantiated and verified results, else an incorrect analysis, while it brings one's own name into disrepute, at the same time misleads and falsifies the labours of others. It only remains now to be seen whether the table prove in practice as useful as it was anticipated to be.

Baker Street, Portman Square, W.

Mr. T. B. Groves said that he had also found a trace of colour in the acid made from amorphous phosphorus, but it was easily removed by animal charcoal.

Dr. Parkinson said that he must reiterate an objection to the test given by the Br. Ph., since, if any phosphate of ammonia were present in the acid, this test would record the phosphoric acid of that salt as being free and available.

Dr. Attfield bore a warm testimony to the valuable character of the table of phosphoric acid densities presented with this paper, which he said would at once rank with the analogous tables of the density of other acids drawn up by Fownes, Ure, Mohr, and others, and which were reprinted in standard works on chemistry edition after edition. It was peculiarly gratifying to him that this sound and laborious work had been done by the first Senior Bell Scholar elected, and it was a proof that those who instituted this scholarship for the encouragement of high aims amongst pharmaceutical students had exercised a most judicious liberality. He could testify to the great care and assiduity with which Mr. Watts had daily for some months pursued the subject.

WHAT ARE THE SOURCE, ANNUAL YIELD, AND CHARACTERISTICS OF THE SO-CALLED VOLCANIC AMMONIA?

BY MR. W. D. HOWARD.

There is no difficulty in giving the requested information as to the source and characteristics of the ammonia; the annual yield is not so easily arrived at. However, whatever information I can give is very much at the service of the Pharmaceutical Conference.

To begin, then, with the source. Almost any chemical handbook will show that the proprietor of those marvellous geological riddles, the boracic acid lagoons of Tuscany, does not succeed in preparing from the waters of the lagoons his acid in a state of purity. In commerce it always appears containing from 13 to 20 per cent. of impurities, besides adherent moisture. Conspicuous among these stand various double salts of ammonia, notably the double sulphate of magnesia and ammonia, and from these the ammonia is derived by a very simple process, viz. the double decomposition which ensues when the soda ash is added to the rough boracic acid in the manufacture of borax. The carbonate of ammonia escapes with the carbonic acid and steam, and is easily condensed by a suitable apparatus. After a second purification it takes the form which is tolerably familiar to the members of the Conference.

To illustrate the subject, I give analyses made of an average of the greater part of the boracic acid imported in each of the years 1858 to 1863 inclusive, representing 9307 casks. As every one of the casks was sampled, and special pains were taken that the annual average should not belie its name, the analyses may be fairly considered to represent the actual yield of the lagoons in those years. Further to ensure accuracy, larger quantities than customary were used in the analyses, as much as 500 grains being generally employed, and some of the more minute constituents being determined on twice that quantity. The average of 1862, which represented 2206 casks, was specially examined for rare earths, but without success. By operating on 5000 grains I obtained traces of phosphate of alumina, phosphate of lime, strontia, and a minute trace of arsenic. No trace could be found of nitric acid, boracic acid combined with a base, nickel, cobalt, zinc, uranium, selenium, or lithia.

The peculiar odour of crude boracic acid appears to me to be due to the organic matter soluble in alcohol. This body is probably connected with the gaseous hydrocarbon mentioned as found in the vapours of the Suffioni in Watts's 'Dictionary of Chemistry,' fol. 636.

	1858.	1859.	1860.	1861.	1862.	1863.
Crystallized boracic acid	83·305	83·54	83·10	84·15	81·752	82·590
Double sulphate of magnesia and ammonia	6·479	5·81	5·58	4·86	7·596	6·696
Double sulphate of manganese and ammonia	·515	1·03	·62	·90	·312	·512
Double sulphate of soda and ammonia	1·474	1·66	1·88	1·59	4·470	2·573
Ammonia alum	·180	·21	trace.	·07	absent.	absent.
Sulphate of ammonia............	3·579	3·01	3·58	3·88	2·437	2·815
Chloride of ammonium	·110	·03	·06	·06	·080	·075
Sulphate of lime..................	·706	·86	·89	·79	·628	·796
Sulphate of potash...............	·196	·45	·29	·43	·351	·396
Persulphate of iron and iron alum	·095	·19	·20	·25	·256	·216
Silica and alumina	·839	·90	1·06	1·00	·957	·958
Peroxide of iron	·084	·06	·02	·08	·043	·070
Sulphur	traces.	traces.	·04	traces.	·035	·020
Free sulphuric acid..............	·050	·03	·12	·16	·007	·008
Organic matter soluble in alcohol..............................	·332	·50	·49	·32	·106	·265
Organic matter insoluble in alcohol..............................	·301	·92	·54	·06	·200	·130
Moisture	1·755	·80	1·53	1·40	·770	1·880
	100·000	100·00	100·00	100·00	100·000	100·000

The only characteristic of the ammonia derived from this source that I am aware of is its perfect purity and freedom from all those minute traces of evil-smelling compounds with which both that made from gas liquor and from bones are so liable to be tainted.

The annual yield of the lagoons is, as I previously stated, an almost impossible problem. Doubtless the amount of ammonia arriving in this country in the boracic acid is a very small amount in comparison with that which is yearly run away in the mother-liquors. Nor do I think that there would be a profit on collecting it, as the price it would fetch in this market would hardly do more than cover the expenses of transit.

Mr. Brady expressed much satisfaction that Mr. Howard's firm had placed in the hands of pharmaceutists liquor ammoniæ of volcanic origin, sufficiently pure for preparing liq. ammon. acet., Br. Ph. Had it not been for this, he thought it would have been next to impossible to find ammonia made from gas-products that would have been sufficiently pure for this critical preparation.

Dr. Parkinson had met with liquor ammoniæ made from gas-liquors in which not a trace of tarry odour could be detected after neutralization.

The Conference adjourned till 4 p.m.

ON EMULSIONS.

BY MR. BARNARD S. PROCTOR.

In our published list of subjects for investigation, my name stands as having undertaken the study of emulsions. At the time this promise was made, I was aware that I could not work it to a satisfactory conclusion in the course of the year, but circumstances soon occurred which made it impossible even to get it so far advanced as to justify a report of progress; unwilling, however, to let the meeting of the Conference for 1865 pass without some communication from myself, I may state to you how the subject arose, and what I had proposed to do.

The subject suggested itself to me, some years ago, from observing that a mixture which was made with balsam of copaiba and an alkali, was, from some cause, a very imperfect emulsion, and that a further addition of alkali rendered it still less satisfactory. At another time I noticed that in making Locock's lotion (from Beasley's formula), a less perfect emulsion was formed, when strong solution of ammonia was used, than when it was prepared with that of ·960 sp. gr.; and that it was most perfect when the mixture was so long rubbed in the mortar, that great part of the ammonia evaporated. These were crude and casual observations. I was not prepared to say whether it was much rubbing or much evaporation which was the cause of the superiority in the latter case, but I was impressed with the subject as being one worth looking into. I remembered often observing that soap was much more effectual than caustic alkali, for removing grease from bottles; I bore in mind also, that most, if not all the natural emulsions, were not far removed from neutrality. These floating thoughts, not systematized, but not forgotten, were occasionally turned over, in the hope that they would at last germinate and give rise to a crop of facts which should prove of practical value.

Questions spring up like weeds in uncultivated ground; they are abundant in the field I have entered upon. I propose now to show you the most conspicuous of these spontaneous growths; some time, probably a long time must elapse, before I can hope to present you with the answers which should be the produce of cultivation.

The first question is, what is an emulsion? Is it essentially a watery fluid, holding in suspension an oily or resinous body? The term is a very indefinite one; all emulsions separate into two parts in the course of time, and we cannot say exactly how slow the separation should be to entitle the mixture to be considered an emulsion. Nor is there any evident reason why other fluids, or fluids and solids, mixing in a similar way, should not be considered emulsions. Milk and chyle may be considered animal emulsions, and the juices of *Taraxacum*, *Chelidonium*, or *Ficus elastica* may be regarded as natural emulsions from the vegetable kingdom; and we would not wait till we had ascertained the length of time required for the separation of their parts, not till analysis had proved the nature of their proximate constituents, before pronouncing them members of the emulsion family. My first queries were in reference to the state or mechanical nature of the mixture. I asked myself, are the suspended particles always spheroidal? If not, are emulsions more perfect when they are so?

Then a series of chemical questions arose. Do alkalies promote and acids hinder emulsifaction? Are the naturally emulsible gum resins neutral? Then a group of physical problems, such as the relation between colloid and crystalloid conditions and emulsibility, and the questions, do substances which promote frothing, the mechanical division of air, also promote emulsifaction, the mechanical division of oil, etc.? These, with many other questions, appeared to occupy an ample field for both inductive and deductive work, in which I had hoped to establish a few interesting principles, and, by the application of these principles, to lay down a few general rules of practical utility to the pharmaceutist. I commenced work by experimenting upon simple oils and water, without addition.

Taking an ℥iss phial, and putting into it half an ounce distilled water, and 1 drachm olive oil; shaking them together, and noting the kind of mixture and the time required for separation; then adding oil, drachm by drachm,—making the observations till there were 6 drachms of oil to 4 of water. Then commencing again with 4 drachms of oil to one of water, the reverse of the proportions first mixed, repeating the observations, step by step, as water was added, drachm by drachm, up to 4 drachms. Had I been able to devote the requisite time to the subject, I should have made similar experiments with almond oil, castor oil, linseed oil, balsam of copaiba, and other materials, as they suggested themselves, and then proceeded to ascertain the effects of introducing other chemical or mechanical elements into the operation; but the series of observations which thus should have been counted by hundreds, was unexpectedly cut short before it reached the tenth of its expected dimensions, and I have now only to draw your attention to two or three points which already bear some interest.

When olive oil was added to water, the mixture separated most slowly when the proportion was 3 drachms of oil to 4 of water, the time required increasing with each drachm of oil up to this proportion, and again decreasing with further additions, till the proportion was 6 of oil to 4 of water. When water was added to olive oil, the separation takes place much more slowly than in the former case; and, when it had been added drachm by drachm, with agitation at each step, till there were equal parts of each, the separation took place only in several hours, instead of as many minutes, which had sufficed in the former case. And there was no less difference in the mixing than in the separating. In the first series the mixing, as far as the fluids seemed likely to mix, was effected by a few seconds of brisk agitation; but, in the second series, a quarter of an hour's agitation or more was required to effect the mixture of the third and fourth drachm of water, and, when it did take place, the mixture became so thick, that it would not rattle when the bottle was violently shaken. A careful examination of two mixtures, each containing equal parts of oil and water, but, in the one case, the oil being added drachm by drachm to the water, with agitation between each addition, and, in the other, the water being added in like manner to the oil, showed, that in the former, the oil was suspended in the form of globules, the water occupying the interspaces; and, in the latter case, the water was globular, the oil of course occupying the interspaces. As in the ordinary cases of emulsion, the oil is globular, we will, for convenience, call this condition of positive emulsion (+), and when the water is globular, name it a negative emulsion (—). From one or two observations, (+) emulsions mix freely with water, but not with oil, that is, if poured into it, they settle to the bottom as a distinct layer, while a negative emulsion poured into oil diffuses through it, but poured into water refuses to mix; if agitated with a large bulk of water, it separates into globules, but each globule is not a globule of oil, but of (—) emulsion.

Two drops of ·960 ammonia being added to ½ oz. of one of these (—) emulsions caused speedy separation of great part of the water, the oily portion floating like cream on its surface, but did not mix upon agitation; a further addition of ammonia converted the whole into an ordinary emulsion.

I have not yet sought for an agent that would convert a (+) emulsion into a (—) form, though such will probably be found in some lead compounds, judging from a casual observation. The (—) emulsion being so thick, so nearly solid, I put some shot into one of them to facilitate the further mixture of water, which it did in so marked a manner that I judged it not a purely mechanical effect; the more so when I ascertained that fine gravel did not act in a like manner, but each little pebble attracted to its surface a film of water. The shot did not specially attract either water or oil.

2 drachms of oil and 4 of water, being converted into a (—) emulsion by ten minutes' agitation with clean shot, showed scarcely any appearance of separation after standing at rest for four days.

Castor oil and almond oil both showed much less willingness to mix with water in anything like equal proportions, only a small portion of oil remaining suspended in the water, and a small portion of water in the oil. Balsam of copaiba very readily yielded a negative emulsion when agitated with successive small portions of water till the bulk of water equalled or exceeded that of the balsam; it was a thick creamy yellowish semifluid: the addition of a little solution of potassa made it much whiter and mobile, by converting it into a positive emulsion.

Solution of bicarbonate of magnesia promotes the formation of negative emulsion between water and almond oil; solution of diacetate of lead has the same effect with water and olive oil; the addition of acetic acid to the latter till it had an acid reaction did not alter its character.

Two or three years ago, while experimenting upon the intersolubility of liquids, I observed that strong liq. ammoniæ, agitated with an equal bulk of ether, boils violently. They become viscid and opalescent if agitated in a stoppered bottle, and if the stopper be removed while they are mixed the disengagement of gas throws the fluids out of the bottle; but if allowed to separate under pressure they are not disturbed by the removal of the stopper. From the viscidity of the mixture of two liquids usually so mobile, I conjectured they were in the condition of a negative emulsion.

The relation of emulsibility to intersolubility is a branch of the subject suggestive of interesting speculations.

There is also an interesting group of questions to be investigated, relating to the influence of the relative density of the suspended matter and its medium, the state of division to which the former is reduced, and the viscosity or mobility of the latter and their effects upon emulsifaction. That density alone is not sufficient to ensure rapid subsidence we have illustrated in the observations recorded by Faraday (on gold in relation to light) in which he found gold in a fine state of division remained suspended in water for months.

I have added one or two observations which bear also upon the mobility of the liquid,—1 grain of heavy carb. magnesia was added to each of the following liquids in tubes of similar size and shape :—water, rectified spirit, ether, chloroform. In the two latter, the magnesia took a somewhat clotty condition, and settled rapidly, the liquids differing greatly in their density, but both having great mobility. In the two former (water and spirit) the subsidence was much slower, and there was no tendency to clot, the liquids occupying a position between the two former, as regards density, but being inferior to them both as regards mobility.

The experiment was repeated, substituting fine powdered charcoal for magnesia. The subsidence was in all cases slower, but the relation before observed was still maintained. In the water and spirit subsidence was not more complete in twenty-four hours than it was in the chloroform and ether in as many minutes. The charcoal also appeared a little clotted in the chloroform. We may conjecture that the great mobility of chloroform facilitates the action of the agglomeration forces, while its density subtracting from the effect of gravitation allows them time to manifest their action.

The recent experiments of Mr. Crookes, showing how readily mercury may be divided when its surface is tarnished by sulphuretted hydrogen, and how readily it again unites when sodium is supplied to abstract the sulphur, suggests that we should look for a film upon the surface of the globules of emulsified oil, and that materials which cause the separation of the oil, may do so in virtue of a power of dissolving or decomposing this film.

In concluding these observations, let me express a hope that some other members of the Conference will add a few notes to my own. On the list of subjects for investigation it is stated that I will be glad to receive communications upon this subject. I have not received a line from any one. I cannot but think that many gentlemen may have fragments of information which while isolated appear valueless ; let me assure all my fellow-members that no observations are too fragmentary or isolated to be thankfully received. To any one engaged in an investigation the most trifling matter is not to be overlooked, and communications always act as an encouragement and stimulant to continued work.

11, *Grey Street, Newcastle-on-Tyne, July*, 1865.

The PRESIDENT spoke of this paper, as worthy of the author, whose logical, conscientious, and painstaking habits of thought were already known to the members. The paper afforded much matter for reflection.

Mr. SCHACHT said that the present paper recalled to his mind some experiments which he had made a few years ago upon the phenomena known as molecular motion.* No object exhibited these singular movements more definitely than the ink of the cuttle-fish. He (Mr. S.) had ventured to theorize somewhat after this manner :—these effects are only produced when very finely divided matter meets with a compatible liquid of nearly coincident specific gravity, and their greatest and most prolonged development takes place when the two substances are such as have a tendency to combine. So far from accepting the idea that had once been promulgated, that the explanation lay in some exercise of repulsive energy, he believed that the same force of molecular attraction that effected the solution of a solid in a liquid where the properties of each made that end possible, in these instances, where solution was not possible, produced results which were due to mutual attempts of the particles to satisfy an attraction which could not, however, be satisfied : hence, a condition of perpetual unrest.

* Pharm. Journ. vol. xviii. p. 375.

ON AQUEOUS SOLUTIONS OF PERCHLORIDE OF IRON, SUCH AS LIQUOR FERRI PERCHLORIDI, B.P.

BY J. ATTFIELD, PH.D., F.C.S.

There are four ways of making an aqueous solution of perchloride of iron, but only one of these gives it in a pure state. To obtain it absolutely pure, the solid anhydrous perchloride—made directly from its elements, chlorine and iron—is simply dissolved in distilled water. This is the method analytical chemists adopt. The practical results of the other methods is to give a solution of perchloride of iron, containing either peroxide of iron or hydrochloric acid. The first of these three faulty processes is that of saturating aqueous hydrochloric acid by iron, and then passing chlorine through the solution till the protochloride of iron is converted into perchloride. The result is a liquid loaded with free chlorine. It is true the chlorine can be removed by ebullition, but simultaneously the perchloride of iron and water react, hydrochloric acid is produced and lost, and peroxide of iron remains to contaminate what remains of the perchloride. The second of the faulty methods is to dissolve peroxide of iron in aqueous hydrochloric acid; it fails because pure soluble peroxide of iron, in a definite state of hydration, is not met with in commerce. And the remaining faulty process is to saturate two-thirds of a given volume of hydrochloric acid by iron, and then remove the hydrogen of the other third by nitric acid. This fails, because heat is necessary to complete the reaction; and with heat decomposition of the perchloride of iron and loss of hydrochloric acid to an unknown extent occurs.* These three faulty methods are those commonly adopted by manufacturing chemists.

But why is the presence of peroxide of iron or of hydrochloric acid in aqueous solution of perchloride of iron to be considered a fault? Without touching the æsthetical or moral aspects of the question, the answer is as follows:—Solution of perchloride of iron containing much peroxide of iron "won't keep;" it soon becomes muddy from deposition of the peroxide. If it contains only a small amount of peroxide, it is persistent; but on being added to a solution of any one of many substances, as in making up a bottle of medicine, the peroxide is then deposited, and makes turbid what should be a transparent mixture. Manufacturing and dispensing chemists have, in fact, learned by experience that to make things work smoothly aqueous solution of perchloride of iron must always contain excess of hydrochloric acid. In this way those who supply the remedial agent in question remove the fault which is an inconvenience to them. But how about those who swallow this medicine? What do medical men, those who prescribe and know the action of medicines, say concerning a preparation whose name is simply perchloride of iron and water, but which contains hydrochloric acid? Well, I must confess that some, high in authority, have told me that "whenever it is necessary to administer perchloride of iron a little hydrochloric acid will probably do good rather than harm." If this be so, I would say to the manufacturing chemist, "Make your solution of perchloride of iron as you please, only take care that it is always acid." If not, I would say to prescriber and dispenser, "Do not make your own solution of perchloride of iron at all, for the solid perchloride is difficult to make or keep dry in small quantities, but order it from a manufacturer who will guarantee that it is so made." I believe a maker of chloride of lime, or any other similar worker in chlorine, could produce pure solid perchloride of iron in the manner I suggest, namely,

* This is the British Pharmacopœia process, but is badly described in that work: operators must use rather less nitric acid, and 10 to 20 per cent. more hydrochloric acid than there ordered, even if the stability of the preparation is the only object desired.

from its elements, as cheap as by any other method. From its tendency to absorb moisture it should be dissolved in water as soon as made, and sent into commerce in the state of solution.

The experiments on which most of these statements concerning perchloride of iron are founded, are detailed in the 'Pharmaceutical Journal' of February, 1865 (second series, vol. vi. p. 396). Specimens of each preparation mentioned were exhibited to the meeting.

ON SPIRITUOUS SOLUTIONS OF PERCHLORIDE OF IRON, SUCH AS TINCTURA FERRI PERCHLORIDI, B. P.

BY J. ATTFIELD, PH.D., F.C.S.

Why is a spirituous solution of perchloride of iron used in medicine at all? Why are spirituous solutions of any kind used? The answer to this second question is, that, firstly, some substances are only soluble in spirit, or better dissolved by spirit than by water; and, secondly, that spirituous solutions (tinctures) of many vegetable substances can be kept without spoiling for a far longer period than aqueous ones. But perchloride of iron is more readily soluble in water than in spirit; and spirit, so far from preserving perchloride of iron, decomposes it with precipitation of a basic chloride of iron,—in fact, in common language, spoils it. Tincture of perchloride of iron will not keep at all unless it is acid, and not then, for any length of time. Why, then, is it ordered in the British Pharmacopœia? Because there is a demand for it by medical men. And why do medical men use it? Because their fathers used it before them, and because they do not know that an aqueous solution is as good and better. On representing these facts to the apothecaries of the great metropolitan hospitals, I was glad to find that in two cases (King's and Middlesex) an aqueous solution of perchloride of iron had already been long used instead of the old spirituous one, or tincture. In several other cases the gentlemen said they should at once propose the substitution to their respective committees. Only in one case was a spirituous solution preferred to an aqueous, "because it has a pleasant, slightly pungent taste and odour." I recommended this gentleman to put his bottle of tincture out in the sunlight for a couple of months, when he would have the old "ethereal spirit of chloride of iron" of former north-German pharmacopœias; it would appear of a pale-green tint, and have full flavour and bouquet, only it would no longer be a solution of perchloride of iron.* But this is a matter of taste, (to prescriber only, not to patient,) and is trivial.

Tincture of perchloride of iron is now ordered to be made by diluting one volume of an aqueous solution of perchloride of iron with three volumes of spirit; let it be diluted with water instead, and the good spirit saved for administration when needed.

The above remarks are partly in abstract of a paper already published in the 'Pharmaceutical Journal' of February, 1865 (2nd series, vol. vi. p. 396).

The PRESIDENT said that the meeting ought to be grateful to Dr. Attfield for his elucidation of the mysterious and troublesome changes that occurred in solutions of perchloride of iron. It was to be hoped that the aqueous solution would be generally adopted by the medical profession. The introduction of medicines that could be prepared cheaply might tend to increase the profits of chemists. At present, when a box of pills had to be sold for sixpence, the cost of the drugs, the box, the label, and the wrapper, left an absurdly small amount to remunerate the chemist for the trouble involved in preparing the

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* Specimens of tincture of perchloride of iron, which had become almost colourless by exposure to direct sunlight, were exhibited to the meeting.

pills, in packing them up, and in sending them home to the customer. Some well-digested scheme for regulating the profits on medicines dispensed by chemists was much wanted.

Mr. ATHERTON (Nottingham) had recommended the aqueous solution to prescribers in his neighbourhood, and they had adopted it.

Mr. C. F. PALMER alluded to cases which had come under his observation in connection with artificial chalybeate waters prepared by himself. On some occasions these waters had thrown down a red precipitate of hydrated peroxide of iron, but by exposure to solar light it had redissolved, and the solution had become almost colourless again. Was this also a case of reduction to a lower degree of oxidation?

Dr. PARKINSON thought that in the case just stated the free citric acid mentioned had acted upon the precipitate.

ON THE ESTIMATION OF NITRITES IN THE PRESENCE OF NITRATES.

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

CHEMIST TO THE APOTHECARIES' HALL OF IRELAND.

When I undertook the task of working out the best process for estimating nitrites, I thought that the problem would be one of extreme simplicity, and never calculated upon the numerous difficulties with which this project was attended. I have carefully gone through the modes recommended by other experimenters (of which there have not been many), and have also tried numerous original plans. From very few of these have I succeeded in getting accurate results. Of course, I now refer to direct modes of estimating nitrites, more particularly in the presence of nitrates. The difficulties are as follows:—1st. All the processes of estimating nitrites directly must be essentially processes of oxidation, as we are not acquainted at present with any available precipitant.*

Therefore arises the difficulty of estimating this compound by oxidation in the presence of a powerful oxidizer, *i.e.* nitric acid. We have no available precipitant for this latter acid either, by which we could dispose of it.

2nd. Another prolific source of error in the estimation of nitrites is one which seems to have been completely overlooked. It is the fact that at the slightest elevation of temperature nitrous anhydride, or nascent nitrous acid, is partially decomposed and oxidized into nitric acid, when in the presence of water—that is, at the expense of that substance:—

$$3\,N_2O_3 + H_2O = 2\,HNO_3 + 4\,NO.$$

Experiments proving this will be referred to further on.

The process recommended by Peligot, Lang, Jahresb. 1862, p. 581, is not applicable to the examination of nitrites containing nitrates. Also, the long digestion at an elevated temperature (twelve hours at 86° to 104° Fahr.) is inadmissible. Lang says he got results only ·6 per cent. out, but I think he must have worked with pure nitrite of sodium.† Feldhaus speaks against this process. In his experiments he seems to have got the results too high; the specimens of nitrite probably contained nitrate. This process seems, in my hands, to give results too low, after the nitrate had been correctly accounted for. The urea

* Nitrate of silver, the most insoluble salt, if we except the cobalt yellows (basic potassio-cobaltic nitrite?), is readily soluble in water, unless the water is at a very low temperature. Whether the cobalt yellow is available for the estimation of nitrites, is the subject of some experiments at present unfinished.

† A known quantity of dried peroxide of lead is added to a diluted solution of the nitrite to be analysed, and the solution mixed with acetic acid. The whole is warmed for twelve hours;—the weight of peroxide dissolved corresponds to the nitrous acid—1 at. peroxide = 1 at. nitrous acid ($2Pb_2O_2 + 2HNO_2 = Pb_2N_2O_6 + Pb_2H_2O_2$).

process has been unanimously condemned. Lang says it is bad, and Feldhaus also condemns it. As regards my own experiments, they were so unpromising that I did not carry on my examination of this method to any extent, for to attempt to estimate quantitatively free nitrous acid by a boiling solution is evidently radically wrong in principle.*

Estimation by permanganic acid we shall dwell upon at some length, for two reasons: first, because the process has been strongly recommended by authorities; and, secondly, from the fact that, at first sight, this, of all the available oxidizing substances, seems the most plausible. Permanganic acid is instantly decomposed, even at 32° Fahr., by nitrous acid; and, from the quickness of the reaction, many plans have been devised to remedy the evils attendant upon this mode of estimation. From the gaseous nature of nitrous acid, it is not desirable to decompose the nitrites first by acids, preparatory to estimating them by a standard solution. To avoid this source of error, Peau de Saint-Gilles has recommended that the nitrite be decomposed by adding *very* diluted sulphuric or nitric acid. "This prevents a loss of nitrous acid;" but that this is not practically correct is evident from the fact, that iodized starch-paper becomes coloured on holding it in the orifice of the flask in which the nitrite is decomposed. Feldhaus says that the salt must be diluted with 2000 parts of water, and the reaction commenced in a very slightly acidulated liquid; when it is nearly completed, more acid may be added if necessary, so as to ensure the marking of the exact point. Lang condemns the process. There can be no doubt that by attention to the instructions given by Feldhaus, and by working at a very low temperature, an approximation may be attained. One of my experiments was to add the nitrite under examination to a known excess of permanganate of potassium, and, as nitric acid was present, to work off the excess by a volumetric solution of oxalic acid. It is, however, impossible to determine the analysis, as, towards the end of the process, a reaction takes place between the permanganic acid added, the manganous oxide resulting in a copious deposit of peroxide of manganese—

$$2\,HMn_2O_4 + 3\,Mn_2O - H_2O = 5\,Mn_2O_2.$$

This reaction seems to take place even more readily in the presence of nitric acid.

I attempted to estimate the nitrites by ignition with oxide of copper, intending to wash the oxide, and, on dissolving it in hydrochloric acid and chloride of sodium, to estimate the amount of cuprous oxide formed volumetrically; but I found, even after prolonged ignition, the nitrite was not decomposed,—or, at least, that the nitrite present underwent decomposition.

The most successful methods are those which I am now about to describe. But I must premise that in all processes of estimating nitrites by oxidation, one thing must be borne in mind, that it is imperatively necessary to set free the nitrous anhydride at a low temperature in the presence of an excess of the oxidizing material; for it must be remembered that nitrous anhydride or nitrous acid, when liberated in the presence of water, is decomposed at slightly elevated temperatures.

The following experiments will illustrate this fact:—If, at an ordinary temperature, a small portion of nitrite of sodium be dropped into diluted sulphuric acid in a test tube, the following reaction will be observed:—The tube will be filled with orange-coloured vapour, whilst a piece of iodized starch-paper, held over the orifice, will be slowly coloured. If, on the other hand, the test-tube be placed in a freezing mixture, previously to addition of the nitrite

* A standard solution of nitrate of urea is heated to boiling, and the solution of nitrite, acidulated, is added drop by drop until the solution produces a blue coloration with starch paste and iodide of potassium. The decomposition is $CH_4N_2O + 2HNO_2 = CO_2 + N_4 + 3H_2O$ —carbonic anhydride and nitrogen being evolved.

of sodium, no orange fumes will be observed, but the coloration of the starch-paper is instantaneous and very decided. In the first instance the nitrous acid was decomposed, as generated, into nitric acid and nitric oxide, the latter being evinced by the orange fumes of pernitric oxide on its coming in contact with the atmosphere. From the foregoing it is evident that to estimate a nitrite by an oxidizing reagent, it is better that the two be brought together at a temperature sufficiently low, that the oxidizer used may grapple with the nitrous acid previously to a reaction being set up between it and the water. Experiments have been tried to find the reaction of two of the principal oxidizers at a temperature of 32°. Fahr. Permanganic acid was instantly decolorized. Chromic acid had no action at 32° Fahr., but on its being placed on one side, so as gradually to attain the temperature of the room, decomposition took place without the evolution of any nitrous oxide.

As stated in a former part of this paper, by a judicious attention to a low temperature, and by a manipulation formed upon Feldhaus's plan, an analysis by permanganate of potassium may be performed, but still inferior in accuracy to the two processes I am now about to describe.

The first process is based upon the reduction of chromic acid to chromic oxide by nitrous acid. This reaction is not so quick as with permanganic acid, but is perfected slowly at ordinary temperatures. Suppose we are analyzing a specimen of commercial nitrite of sodium, the mode of procedure I adopt is as follows:—If the sample contains carbonate of sodium, a weighed quantity, say two grammes, is dissolved in a rather considerable quantity of water, and the carbonate estimated by a standard solution of sulphuric acid, carefully avoiding an excess. To hit the exact point of saturation, I well soak a piece of good litmus-paper in the solution after the addition of each quantity of acid from the burette, and on drying it the exact state of the solution will be perceived. I may here remark that most of the litmus-paper that is bought is not delicate enough for this kind of work, as it generally contains some trace of alkali. A convenient indicator of this point of saturation in this case will be found in a solution of starch and iodide of potassium contained in a test tube: one drop of the solution of nitrite added after each addition of acid will, when the carbonate is all decomposed, strike a blue shade on falling through the starch solution. After noting the amount of carbonate, the solution is in a fit position for the estimation of the nitrite; the remainder may practically be noted as nitrate. Three grammes of pure bichromate of potassium for every two grammes of nitrite taken are dissolved with a little water in a flask fitted with a well-ground stopper; an excess of sulphuric acid is then added, and the flask is placed in a vessel containing a mixture of sulphate of sodium and hydrochloric acid. The solution of the nitrite may be placed also in the same freezing bath for a few minutes previously to being poured *on* the surface of the chromic acid without mixing; the stopper is then inserted, the flask taken out of the freezing mixture, inverted, and left to regain the ordinary temperature of the room; in the course of half an hour or an hour the flask will contain a mixture of chromic acid and chromic salt, the chromic oxide representing the nitrite in the sample. But here, again, in precipitating the chromic oxide a precaution is necessary. If there is any considerable excess of chromic acid left, which is generally the case, when examining commercial samples, the ordinary method of precipitating with ammonia would not do, as a brown precipitate of a peroxide of chromium (chromate of chromium?) not decomposable by ammonia is thrown down, although this substance is instantly decomposed, upon boiling, by a solution of potash into chromic oxide and chromic acid. It is therefore necessary to nearly neutralize with potash, and finish off with a few drops of ammonia, and boil until all trace of the latter substance is gone; but if accidentally too much potash is added, a few drops of chloride of ammonium and a boiling for a few minutes will rectify the mistake. If the manipulation has been correctly performed, it will be indicated by the colour. The dark-brown colour instantly disappears on boiling, the precipitate obtaining the bright-green of chromic oxide, whilst the solution becomes a bright yellow.

The chromic oxide is washed, but for accurate results the hydrated chromic oxide retains the chloride of potassium too tenaciously to ignite and weigh directly. It is better to redissolve the washed hydrated chromic oxide in diluted hydrochloric acid, and to reprecipitate with ammonia in the usual manner. This gives the most exact results; but there are quicker methods. Thus, the hydrated chromic oxide might be washed and converted into chromic acid by Chancel's method (by peroxide of lead), and estimated volumetrically.

$$\text{Chromic Oxide found} \times 1{\cdot}354 = \text{Nitrite of Sodium}$$
$$\because 4Cr_2O_3 + 3N_2O_3 = 3N_2O_5 + 2Cr_4O_3.$$

The second process is based upon the first, that both nitrites and nitrates of the alkalies are converted into chloride upon ignition with chloride of ammonium. Pure nitrite of sodium gives 84·78 per cent. of chloride of sodium, whilst nitrate of sodium only gives 68·82. From these data, it is therefore easy to calculate the percentage, as anything under 84·78 indicates the presence of nitrate.

It must be borne in mind, that if the specimen contains carbonate, this would give the percentage of nitrite too high. As 100 parts of carbonate would give 110·37 parts of chloride of sodium after ignition, therefore it will be necessary to deduct an equivalent quantity of chloride of sodium from the results before calculating them. A weighed quantity of the nitrite is intimately mixed with powdered chloride of ammonium, and introduced into a platinum crucible, a gentle heat is applied, until the whole of the excess of sal ammoniac and other gaseous bodies are volatilized. The residue is dissolved in water, and the chloride of sodium estimated volumetrically with a silver solution.

After a deduction for any carbonate of sodium present, the calculation may be made thus:—

$$\frac{(\text{Na Cl} - 68{\cdot}82) + 100}{15{\cdot}96} = x,$$

x being the percentage of nitrite of sodium. The chloride of sodium left, minus the percentage of nitrate, divided by the difference (15·96), will give the percentage of nitrite, or *vice versâ*:—

$$\frac{(84{\cdot}78 - \text{Na Cl}) + 100}{15{\cdot}96} = x,$$

x being in this case nitrate of sodium.

Nitrate of ammonium in solution is resolved on boiling into nitrogen and water. The applicability of this phenomenon to the estimation of nitrites will form the subject of a future communication.

Many of the numerous experiments necessarily performed in connection with this paper were made by my late assistant, Mr. Arthur Cranwill, to whom I take this opportunity of tendering my thanks.

NOTE ON NITRITE OF SODA.

BY MR. W. D. HOWARD.

Mr. Warington's able paper in the 'Pharmaceutical Journal' for July, has pretty much exhausted this subject. I do not, however, remember to have seen noticed a tolerably ready method for purifying the rough nitrite of soda from much of the undecomposed nitrate which in practice it always retains. This method consists in taking advantage of the slight difference in solubility between the two salts which is sufficient to enable the nitrate to be in great measure removed before the nitrite begins to crystallize out. A sample of rough nitrite, treated in this way, which originally contained 18·9 per cent. of nitrite of soda was purified till it yielded 40·3 per cent. As the crude nitrite invariably contains either carbonate of soda, caustic soda, or a mixture of both, this method will not alone enable a perfectly pure product to be prepared.

Dr. Attfield said, some of his students had succeeded in making crude nitrite of soda by fusing nitre with charcoal at a temperature so low that no deflagration whatever took place. The product was, however, anything but satisfactory, though, to be sure, it was difficult to ascertain its exact value by any method of analysis he knew of. The conversion of a nitrite into the ammonia salt, and estimation of the bulk of nitrogen evolved from that salt on heating was the most promising process he had tried.

ON THE PURITY OF COMMERCIAL BROMIDES AND IODIDES OTHER THAN IODIDE OF POTASSIUM.

BY HENRY MATTHEWS, F.C.S.

Nineteen samples of bromides and iodides were examined, consisting of seven samples of bromide of potassium and three each of the bromides and iodides of ammonium and cadmium. The results of the analyses are given in the tables annexed.

BROMIDE OF POTASSIUM.

	I.	II.	III.	IV.	V.	VI.	VII.
Carbonate .	0·5	0·45	0·	0·	0·	0·	0·25
Sulphate . .	0·25	1·08	0·87	0·57	0·	0·	0·51
Bromate . .	0·	trace.	trace.	0·	0·	0·	trace.
Chloride . .	3·28	5·01	1·95	2·83	0·	0·7	2·11
Iodide . . .	0·51	trace.	2·11	3·88	0·	0·	0·04
Water . . .	1·69	0·8	0·74	0·96	0·22	0·51	1·
Bromide . .	93·52	92·97	93·86	91·66	100·04	98·71	95·86
	99·75	100·31	99·53	99·90	100·26	99·92	99·77

BROMIDES OF AMMONIUM AND CADMIUM.

	Bromide of Ammonium.			Bromide of Cadmium.		
	I.	II.	III.	I.	II.	III.
Carbonate . .	0·	0·	0·	0·	0·	0·
Sulphate . .	trace.	2·99	0·	0·	0·	0·
Bromate . . .	0·	0·	0·	0·	0·	0·
Chloride . . .	0·44	0·8	1·34	0·73	0·45	0·
Iodide . . .	0·	trace.	0·	trace.	trace.	0·
Water . . .	2·35	3·08	1·41	13·78	19·73	19·41
Bromide . . .	97·46	92·85	96·9	86·08	79·60	80·38
	100·25	99·72	99·65	100·59	99·78	99·79

IODIDES OF AMMONIUM AND CADMIUM.

	Iodide of Ammonium.			Iodide of Cadmium.		
	I.	II.	III.	I.	II.	III.
Carbonate . .	0·	0·	0·	0·	0·	0.
Sulphate . . .	6·93	0·	6·02	0·	trace.	0·
Iodate . . .	0·	0·	0·	0·	0·	0·
Chloride . . .	0·07	0·08	0·23	0·08	trace.	0·09
Bromide . . .	0·	0·	0·	0·	0·	0·
Water . . .	4·68	0·83	2·43	0·17	0·4	0·27
Iodide . . .	88·28	98·93	91·32	99·68	99·58	99·61
	99·96	99·84	100·00	99·93	99·98	99·97

The methods adopted for the determinations were—

1. Carbonate. By a standard solution of sulphuric acid, 10 cubic centimetres of which were equivalent to 0·05 grammes of KO, CO_2.

2. Sulphate. In the usual way, by precipitation with chloride of barium.

3. Chloride, bromide, and iodide. In the bromides, about 2 grammes of the salt, dissolved in water, dilute nitric acid added, and then agitated with chloroform, more chloroform being added until the chloroform remained colourless. The chloroform is well washed with distilled water, and the chlorine and bromine determined in the aqueous solution by precipitation with silver, and afterwards heating a weighed portion of the precipitate in a current of chlorine. The iodine was determined by deducting the weight of the silver precipitate obtained after the removal of the iodine from the weight of a corresponding silver precipitate obtained from a portion of the original salt.

In the iodides, the chlorine and iodine were determined by weighing the precipitate by nitrate of silver, and afterwards heating a weighed portion of that precipitate in a current of chlorine.

Bromine in the iodides was searched for qualitatively by mixing a portion of the salt, dissolved in water, with dilute sulphuric acid and a little starch-paste, adding fuming nitric acid, and then chlorine water, until the blue colour produced by the iodine and starch disappears; the further addition of chlorine water will now liberate the bromine, if present, and it may be removed by means of chloroform. No bromine, however, was found in any of the samples of the iodides.

4. Water. By heating in the air-bath, at a temperature of 120° C., until a constant weight was obtained.

The results to be deduced from the analysis are, that the bromides of ammonium and cadmium and iodide of cadmium are practically pure; the same cannot be said of the bromide of potassium; and with regard to the iodide of ammonium, the principal impurity is the large quantity of sulphate found in two of the samples, and the presence of which in such quantities is somewhat difficult to account for.

The whole of the samples, with the exception of five forwarded to me by Dr. Attfield, were purchased at the shops of well-known chemists and druggists, and varied very considerably in price, the highest-priced not being always the purest.

Dr. Parkinson remarked upon the large and very improper quantity of sulphuric acid shown in the analyses of iodide of ammonium. It indicated pretty clearly the method of manufacture adopted, viz. the decomposition of sulphide of ammonium by iodine.

Mr. Reynolds said that he had recently tested four specimens of iodide of potassium obtained direct from the makers in Paris. With one exception, all contained so much iodate as to make their use inadmissible, and all were much inferior to the salt of a well-known London manufacturer.

REMARKS ON EXTRACTS OF MEAT.

BY HENRY B. BRADY, F.L.S., ETC.

(This was a short verbal communication, of which the following is as full a report as can be furnished.)

The author stated that he should not have ventured to occupy the time of the Conference, already over-crowded with business, still less would he have intruded on the regular order of written papers, but for the concluding remarks in the President's address, and the desire which had been expressed by several members that he should open the subject for discussion at that sitting.

There were several forms in which the soluble extractive of meat had been used, either for general dietetic purposes, or for the convenience of the sick-room: the most important were those obtained from beef, and he would confine his remarks to them. Firstly, there were the fluid preparations represented by Gillon's "essence of beef;" secondly, those of gelatinous consistence, of which excellent examples were largely sold by one or two London manufacturers, to which class also belonged the so-called "osmazôme glacée;" thirdly, the more permanent soft extractive, free from gelatine, known as "extractum carnis, Liebig;" and fourthly, a somewhat similar article, thickened with starchy matter, and evaporated further so as to form lozenges or tablets. On each of these he would say a few words:—

Gillon's "essence of beef" was, he believed, exactly what the makers professed, a carefully prepared beef-juice, having many advantages over anything that had preceded it for use in the sick-room. There were, however, drawbacks in connection with it; it was insipid, variable in strength, contained a good deal of gelatine, and did not always agree with invalids; still, it was a convenient and valuable basis for beef-tea, and it was fortunate that, with the present uncertain supply of other meat-extracts, there was anything so reliable to be obtained, even at a somewhat advanced price.

Of the gelatinous preparations he had only seen the "concentrated beef-teas," prepared by Messrs. Fortnum and Mason and Messrs. Brand and Co. These were supplied of the consistence of firm jelly, done up in skins, each weighing half a pound to a pound. They appeared to be, essentially, extracts of beef containing the gelatine, and when fresh, answered well for the preparation of beef-tea. The great objection to them was the difficulty of keeping them; in a damp place the bladders moulded on the outside, in a dry place the jelly lost water, and after a time became quite hard, and about the texture of glue, in which condition it was dissolved with great difficulty. The price, too, was against their general introduction. Recently, a material of somewhat similar character had been largely imported into France, from Rio Grande, under the name of "osmazôme glacée," of which he regretted that he had not yet been able to procure a sample, but it appeared, from all accounts, to have the worst qualities of this somewhat objectionable form of extract.

The third substance in order, the so-called "extractum carnis," of Liebig, might be said to have been introduced to the notice of the public in this country by a paper in the 'Popular Science Review' for April, 1865, and within a short time the article itself was offered for sale in London, in small quantities, at a high price. Its recent commercial history was probably known, by dire experience, to all present,—its very excellence seemed to be the likeliest cause of its failure in a commercial point of view. The demand had been excessive, the supply, hitherto, had been very limited. The process employed in its manufacture had been suggested some years ago by Baron Liebig, though it had, until recently, only been carried out on a comparatively small scale. In the Royal Pharmacy, at Munich, it was still prepared to a considerable extent, under the direction of Professor Pettenkofer, and, indeed, they had a ready sale for all they could make at the somewhat high price of a florin and twelve kreutzers (a little over two shillings) per ounce. The process as settled by Liebig and Pettenkofer had been adopted in the Bavarian Pharmacopœia, and was closely followed in the laboratory at Munich. It was pretty much as follows, speaking from memory:—

Five pounds of fresh beef cut very small and deprived of bone, tendon, and fat, were digested at 212° (in a steam pan) for an hour, in ten pounds of water, and the liquor separated by strong pressure; the residue again digested in a similar way with the same quantity of water, and again subjected to pressure. The mixed liquids were evaporated to about three pounds weight, and allowed to cool; after standing, the fatty matter was skimmed off, and the evaporation continued until an extract of ordinary consistence was obtained. Ten pounds of meat should yield six ounces of extract. A specimen of extract so prepared, given him by Professor Pettenkofer during a recent visit to Munich, was on the table, and it would be found to possess, in a high degree, the qualities sought in such a preparation. The process originally devised, which depended only on heat and strong pressure for the exhaustion of the meat, had been found wasteful in practice, and had been discontinued in favour of the use of water, as in the formula given.

The large numbers of wild or semi-wild cattle slaughtered in South America for the sake of their hides and fat, suggested an obvious source for the cheap production of such an extract, and, though long neglected, the matter had been recently taken up by Herr Giebert, a German civil engineer, resident in Uruguay. This gentleman, after consulting Baron Liebig, and receiving personal instruction in the mode of preparation from Professor Pettenkofer, had established works on a considerable scale in Uruguay, from which all the extract which had come to this country had been derived. The specimens were excellent, though, it must be confessed, not quite equal in point of flavour and consistence to that prepared at Munich, but there seemed no reason why it should not become so after longer experience in its manufacture. The difference between the two was chiefly attributable to faults in its preparation, which were by degrees being remedied. The *nature* of the extract obtained from the flesh of semi-wild cattle did not differ from that obtained from domesticated oxen; it was, however, singular that the *proportion* of extractive matter to flesh was greater in the latter than in the former. Thus the flesh of wild cattle yielded about three per cent. of extract, that of domesticated oxen about three and eight-tenths per cent., or about one-fourth larger quantity.

He should say very little on the purely chemical portion of the subject; for, though he had made a considerable number of experiments, hoping to determine some of the chemical questions which arose, he had been compelled to leave them in a half-finished condition. The extract was soluble in boiling water, about one-half soluble in alcohol, and partially soluble in cold water. It appeared to contain creatine, potash, lime, and magnesia, with phosphoric and lactic acids. The insoluble residue, after treating with cold water, appeared to be chiefly creatine and phosphate of magnesia. When examined under the microscope, the extract showed large crystals of creatine and phosphates. One very singular point in connection with it was the enormous number of bubbles of gaseous matter held in suspension; even heating the extract to the boiling-point seemed to make but little difference in this respect. Whether these were attributable to air mechanically diffused through it by the constant stirring during its evaporation, or whether they were the results of some slow decomposition (nitrogen or carbonic acid), he was not able to say, but he was inclined to the latter belief.

In respect to its nutritive properties, it had been disputed that the *Extractum Carnis* was equal to the amount of beef which it was supposed to represent, *i. e.* to thirty times its own weight. For a person in full health, the fibrous portion of the flesh was probably required as plastic material, or, at any rate, as a diluent for the extractive matter; but the case was far different with invalids; and, probably, no food which had been proposed was of equal value in preventing waste of the tissues during illness. Professor Pettenkofer had spoken of the extraordinary effects of a mixture of a strong solution of the extract, with wine, as a restorative after severe accidents, and of the striking statistics obtained by himself and Baron Liebig in the convalescent wards of the Royal Military Hospital at Munich, which seemed to indicate that under the free use of the extract the period of convalescence was reduced to one-third of the duration common under the old regimen. The mere quantity of phosphates and chlorides contained in the extract, upon which so much stress had been laid by some, was not enough to account for these facts. That the extractive matter was the most important nutritive portion of flesh was also shown by the circumstance that dogs fed upon the exhausted fibrine rapidly starved.

If the *Extractum Carnis* could be procured in quantity, it seemed likely be of incalculable value as an addition to the somewhat limited dietary of sea-going vessels on long voyages. In salted meats the potash salts were replaced by the chloride of sodium, and to this cause the prevalence of scorbutic diseases was, with fair reason, assigned; but this preparation would supply the deficiency, and thereby conduce to the health of the seamen.

The author trusted that, at no very distant time, the present uncertainty in the supply might be obviated by the manufacture being carried on in many other parts of the globe where there was large trade in hides. Our own great colony of Australia ought not to be behind-hand in the matter; and when it was known that the comparatively valueless flesh of wild or semi-wild cattle might be turned by a simple process into a remunerative article of commerce, the supply must surely keep pace with the demand.

Allusion was lastly made to the "Extract of Beef Lozenges," made by Messrs. Gillon and Co. They appeared to be the fluid essence of beef, made by the same firm, evaporated down, and sufficient starch or flour added to render them of suitable consistence for cutting into tablets. The addition of starchy material was requisite, as the continued evaporation could not be carried on without danger of decomposition, and the extract was, to some extent, hygroscopic, unless mixed with drying matter. Like the fluid preparation, the lozenges contained a good deal of gelatine, and a gluey smell and flavour was evolved on evaporating a solution of them. They could scarcely be considered of much practical importance, though their sustaining virtues had been exalted by some Alpine Club men, who had used them in long mountain journeys.

(The communication was illustrated by specimens of many of the preparations spoken of.)

The President expressed great interest in the subject of this paper, whether viewed from a dietetic or an economical point. In connection with the latter aspect of the question, it was important to understand the real value of the fibrine remaining after the extraction of soluble matters from the meat. He could not accept the experiment of starving dogs by this substance, as proving it to be worthless as a nutrient. Our requirements, as to food, included many substances, and if the whole of the soluble salts were removed, it was not therefore logical to say that the residue had no value. These soluble salts were wanted for our invalids, but might not mineral matters be added to the residual fibrine, which would give it a certain food-value, or might it not be used jointly with other foods?

Mr. Brough could speak from personal experience respecting the remarkable restorative power of beef gravy prepared in such a way that the whole of the soluble constituents of the beef were present.

Mr. Atkins (Salisbury) had formed a very favourable opinion of the Extract. Carnis made by Liebig's process, more especially from having seen cases in which it suited patients admirably where Gillon's Essence of Beef could not be taken. He thought that its entire freedom from gelatine was the cause of this superiority. Mr. A. would like to know if it was probable that *charqui*, or jerked beef, could be used for the preparation of an extract.

Mr. T. B. Groves had made the extract of beef twelve years since. He then used beefsteaks, and obtained 5 per cent. of extractive, which gave 50 per cent. of mineral matter, consisting of phosphates of lime and magnesia, chlorides, etc.

Dr. Edwards remarked that whatever value we might be disposed to place in this extract, we should do wrong if not bearing in mind the absolute necessity for a mixed diet for invalids. Such experiments as starving dogs upon gelatine proved nothing as regards the nutrient qualities of the substance, but they might teach us the impropriety of refusing that mixture of foods which was a *sine quâ non*. Looking at the inexhaustible stores of fish with which the ocean teemed, the arrangements for obtaining which were most imperfectly developed, he thought that this class of food deserved the application of similar processes for its utilization.

Mr. Schacht said that some critics of Liebig's Extract. Carnis appeared to have overlooked the fact that it was devised for invalids, and not for those in health, and was intended to furnish, in an available form, principles which the invalid could not take in their normal state as elements of solid food.

THE EFFECTS OF SOIL AND CULTIVATION ON THE DEVELOPMENT OF THE ACTIVE PRINCIPLES OF PLANTS.

BY THOMAS P. BRUCE WARREN, PRÉPARATEUR IN THE LABORATORY OF MR. WILLIAM HOOPER,

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To the most casual observer, it is evident that plants which grow on one soil will not grow on another. It does not require an extensive knowledge of botany, to detect that the primary functions of plant life, though similar in all classes, vary in energy in different plants, and even in parts of the same plant; it is the adaptability of the organs for the performance of these functions, which establish the locale of plant existence.

We are able by certain means, to modify the habits of a plant, as to cause it to grow under conditions which are not normally demanded by its nature, or the energy of its functions; from this remark, a plant may be said to be cultivated when grown under constrained conditions.

It would be difficult to define precisely the limits of cultivation, for the removal of a plant from a soil naturally selected by it, or on which it grows, as it were, *suâ sponte*, to a soil equally fitted for its peculiar habits, can hardly be considered as cultivation.

It is, however, more difficult to imitate nature on such a point, than to supply the exact pabulum for a plant, or to sustain those conditions under which a plant grows in a wild or natural state.

The circumstances which I proposed to consider, as affecting the medicinal value of a plant, are :—mutilation, when giving rise to an unnatural development of particular parts; effects of soil, as indicated by the chemical analysis of the soil and plant; and situation, with reference to the supply of air, light, and moisture.

The principle of mutilation is not generally practised, although by suppressing the development of flowers, a larger number of leaves may be obtained. In the case of the Labiatæ, we may by suppressing the development of wood, produce a larger quantity of oil, but it does not appear that by the mere removal of leaves, a larger quantity of oil is obtainable, more flowers are developed, but the yield of oil is proportionally diminished; this might possibly admit of explanation, from the importance of the functions which the leaves perform in regulating evaporation and supplying air, the main features in the elaboration of the vegetable fluids.

Mutilation will not in every case account for the non-development of any particular organ or part of a plant.

I planted about three years ago, but without determining the suitability of the soil, several slips of rosemary: they have all put out abundance of shoots and leaves, but the number of flowers has been very insignificant; no mutilation has ever taken place. At the same time I laid out several plants of lavender, which became completely exhausted after the second year, and out of forty slips planted at the same time, not one struck; this, I have since discovered, may be explained by the chemical condition of the soil (see analysis in Appendix), and the physical requirements of the plant.

Non-mutilated lavender plants yield considerably finer flowers, when grown on a suitable soil, but the quantity is much less than from plants in which the development of wood is prevented, and the yield of oil is greater in the latter case; the same remark applies, though less forcibly, to peppermint and rosemary.

The injudicious mutilation of lavender plants, explains to some extent the great differences in the yield of oil obtained by different growers.

Mutilation, when practised, should be regulated by the season and exposure of the plant.

I am strongly of opinion that mutilation is not confined to the Labiatæ, although I hesitate to include the result as arising from mutilation, rather than an indication of hybrid development; but it is a singular fact, that henbane plants, when cultivated, show a tendency to capitate inflorescence, whereas the same plants (self-sown) are strongly disposed to a racemose arrangement of its flowers, and in this case an enormous yield of flowers is produced compared with the quantity of leaves. The cultivated plants indicate more or less an axillary inflorescence, and the capitate disposition should perhaps be regarded as arising from an abortive development of the stem.

My experiments on henbane were far advanced when I first observed this, as it was only after flowering that I distinguished any difference in the plants.

In the case of plants, when the unexpanded flowers are gathered, as roses, it would be very desirable to determine whether any difference exists in the medicinal value of the flowers first collected during the season, and those which are gathered near the end, for it is evident that this imposes no less on the energies of the plant, than mutilation in the general acceptation of its principle, and I hope to return to this inquiry at an early period, to determine the difference, if any, which arises through the gradual though unavoidable exhaustion of the plant.

I have performed an extensive series of experiments on this point, to determine whether such plants as belladonna, foxglove, and henbane should be allowed to perfect their flowers or seeds before the leaves are collected for the preparation of medicinal extracts. I find that the amount of active principles contained in the leaves, remains the same both before and immediately after flowering; it is slightly diminished in the stalks and roots after the fall of the flower, and gradually accumulates in the remaining appendages of the flower.

The maximum accumulation in the seeds and seed-vessels of foxglove and stramonium, I have found to be attained before the seeds change their colour.

In the case of belladonna, this is not so strongly marked as in foxglove, henbane, or stramonium.

With good specimens of foxglove recently collected, it is easy to obtain the colour reaction of digitaline, by simply moistening the seeds with dilute sulphuric acid.

These experiments have been confined entirely to the biennials, in some cases transplanted so as to be within easy access.

Although I have closely studied the effects produced by cultivation, and have prepared several artificial soils to determine the effects produced by differences of mineralizing ingredients, I regret that the information which may be deduced from my experiments is so limited. This is necessitated by the fact, that it is not easy to detect any differences in the mineral composition of the juices of a plant, which may be raised on soils having a slight difference in their mineral constituents; and since time is required for the indication of a maximum effect on the chemical constitution of a plant, and the degree of acceleration with which such effect is produced, and as my experiments have been limited to a single year, it is not right to infer that the results indicated form the totality of what might under the continuation of the experiment be expected.

There can be no doubt that the continual raising of medicinal crops upon any soil, without supplying the same with manure in some form, must be followed by an alteration in the chemical constituents of the plants; such effects can be determined only by experiments extending over three or four years. From the information which I have been able to gather, it is quite probable that the careful application of manure to medicinal crops is of essential importance, and that merely restoring the saline matter to the soil which had been extracted during vegetation will not maintain its productive capacity.

Most growers with whom I am acquainted adopt the principle of rotation, but the most experienced prefer supplying their land with rich stable manure after each crop. The principle of rotation is ultimately exhaustive, but by a judicious combination of both principles better crops are obtained, both in quantity and quality.

Plants which are disposed to hybridity should be frequently renewed from the seeds of the wild plant; in general, the appearance of medicinal plants under cultivation, as far as my opportunities have extended, show a decided absence of hybrid species. This, I think, is produced by selecting for propagation such plants which are symmetrical in their physical and botanical development.

I have been informed that the parings of horses' hoofs is, or was, extensively used at Mitcham for lavender and peppermint crops, and although they certainly contain a considerable quantity of phosphate of lime and nitrogenized matter, it is difficult to understand their suitability as a manure, unless, from their slow and gradual decomposition, the soil is kept in a more uniform condition for a much longer time. I have not been able to determine the absolute value of this dressing for oil-yielding crops, but as far as its application for producing lavender flowers for "bunching," it seems eminently suited. The grower who used this to the greatest extent did not cultivate lavender for distillation.

It has been stated that henbane and foxglove lose their activity by drying, in consequence of a reduction of their active principle. This I am not able to support. I find that their active principles, as well as those of many other plants, are rendered less soluble, from a modified state of combination being produced.

By imperfect drying, fermentation might arise which might alter the remedial value of any preparation from these plants; but experiments are still wanting to prove that active principles are capable of conversion by direct fermentation, or decay, and toxicologists assure us that organized structures are not able to transform into other compounds the elements which form the molecule of an alkaloid.

Many growers have informed me that they are obliged to let their crops stand until the supply from foreign growers is ready for the markets; the result is, that in many cases the plants are allowed to remain some time after flowering before the officinal parts are collected, and since my experiments are so strongly opposed to such practice being allowed, it has suggested itself to me that a plan which might remedy this would be for pharmaceutists to insist that the plants should be supplied with their flowers, which would serve as a guarantee for the perfection of their condition.

It is much to be regretted that chemists, in determining the constituents of a plant, have overlooked the important relation which exists between the assimilative action of plants for the mineral constituents of the soil. In the case of plants supplied with highly nitrogenized manure, I have always found a much larger proportion of phosphates and nitrates, and variable proportions of soda salts; the latter can only be considered as arising from the manure. As such plants invariably yield a greater number of flowers, the analysis of the parts of the plant, if allowed to perfect its flowers, can only be complete when the proportions of its separate parts are only considered.

I met with a most singular illustration of how the mineral constituents of a plant may vary, in some foxglove plants, which, in order to facilitate my experiments, were transplanted in the early spring. These plants were taken from a wood near Wimbledon, with a portion of the soil for analysis. The soil consisted principally of decayed vegetable matter, and yielded on incineration about 9 per cent. ashes, of which 7 per cent. was soluble in water and dilute sulphuric acid, the remaining 2 per cent. consisted almost entirely of oxide iron and silica. The complete analysis of these soils will be found in Appendix A.

The incineration of the leaves and stalks yielded about 4 per cent. ashes when taken from the soil referred to, and, after removal to a slightly manured soil, yielded nearly 10 per cent. ashes. The juice extracted from the leaves in July gave considerable quantities of phosphates, nitrates, and chlorides, with traces of sulphates. I analysed at the same time the juice extracted from the leaves of the plants growing on the original soil, it yielded larger proportions of chlorides and sulphates. The yield of ashes, on the incineration of the leaves and stalks, was about 6·3 per cent.

The analysis of the soil to which the plants were removed is given in Appendix B.

My experiments on belladonna, which have been confined to cultivated specimens, support the conclusion that very marked differences in the chemical composition of the soil gives rise in a corresponding degree to differences in the saline constituents of a plant, and that where the differences are but slight, no sensible difference is produced in the amount of mineral matter contained in the plant.

From the seeds of these plants I obtained:—Albumen, gum, inulin, phosphate of soda, nitrate of potash, chloride of potassium, sulphate of potash, an acid salt of atropia, malic and mucic acids, chlorophyll, and a peculiar principle,* similar to chlorophyll.

Hot water extracts a very large proportion of phosphates and sulphates, which are readily deposited in a crystalline form. At different seasons the organic salts are found to offer the greatest variation; many are detected only after the fall of the flower. I could not detect mucic acid in any part of the belladonna plants except the seeds. The presence of malic acid in stramonium seeds increases after the fall of the flower, but is also found in the juice extracted from the leaves. In nearly all cases the juices extracted from the seeds react much more strongly on litmus paper than the juices from the leaves or stalks, and it is a notorious fact that this acid reaction disappears by drying the plants.

The following is the percentage of active principles and salts obtained by my experiments from the following plants, grown under different conditions:—

Name and Condition of Plants.	Seeds.	Leaves.	Leaves, Stems, and Stalks.	Salts.
BELLADONNA (*Atropa Bellad.*) Highly manured	4·5 berries.	4·3	3·8	12·0
Same, under ordinary cultivation	4·5 berries.	4·0	3·0	8·7
FOXGLOVE (*Digitalis purpurea*). Wild	9·2	9·0	8·0	10·0
Same, transplanted to a rich soil, manured slightly . .	10·1	8·6	8·0	14·0
STRAMONIUM (*Datura Stramon.*) Self-sown from cultivated plants.	3·0 without pericarp.	2·9	2·0	2·9 seeds and seed-vessels.
Same, under cultivation . .	3·0 without pericarp.	2·0	2·5	3·9 seeds and seed-vessels.
HENBANE (*Hyoscyamus niger*) Cultivated	4·0	3·6 before	3·0 flowering.	12·0 leaves and stems.
HEMLOCK (*Conium maculatum*) Wild	6·0	6·0	4·8	not determined.
DULCAMARA (*Solanum Dulcam.*) Wild	7·2 Ripe	6·0 berries.	6·0	variable.

The effects produced by situation are of very great importance; a proper supply of air and moisture should form the first consideration for oil-yielding

* This principle, I find, exists in the seeds of all plants on which I have operated; it differs from chlorophyll, first, in its solutions not becoming yellow on exposure to the air, and secondly, its insolubility in hydrochloric acid. It may be isolated by digesting the alcoholic extract in a mixture of hydrochloric acid and ether, and separating the supernatant solution, and allowing it to evaporate spontaneously. It then remains as a soft, oily substance, possessing the odour of the plant from which it is extracted.

M. Fremy has announced to the Academy of Sciences that he has found a substance in the leaves of plants which he regards as a modification of chlorophyll, and from its general properties I am inclined to think that it is identical with what I have found in the seeds and seed-vessels, but it certainly performs a different function here to that suggested by M. Fremy with regard to leaves.

crops, and the soil best adapted should contain a proper proportion of silica, alumina, and lime, which seems to me can only be determined experimentally for each crop.

The finest specimens of camomile flowers are obtained by carefully laying out the plants in rows, not nearer to each other, on any side, than two feet. By allowing sufficient space, growers compensate for such plants which require a more exposed position than can be obtained in the general way of cultivation.

The tendency which some growers have of planting closely may explain the differences which have been observed in the medicinal effects of some plants, as foxglove and henbane. It is highly probable that growers have been stimulated to this practice by competitive impulse.

It is well known that plants which are secluded from light cannot perfect their seeds, nor effect the deoxidation of carbonic acid. As this results where the plants are situated closely to each other, especially if they have large leaves, it is highly probable that species may be produced. This may serve to explain the singular effect which I have already noticed in reference to henbane.

Appendix.

A. *Analysis of Soil from a Wood near Wimbledon.*

Chlorides, magnesium and potassium	2·1
Sulphate of lime	·3
Carbonate of lime	3·5
Carbonate of magnesia	1·1
Oxide of iron and silica	2·0
Water (lost at 212°)	12·0
Organic matter	73·0
Loss	6·0
	100·0

B. *Analysis of Soil;* vide *page* 213.

Phosphate of lime, with traces of magnesia	9·0
Chlorides of potassium and sodium	4·6
Sulphate of lime	·5
Nitrate and phosphate of ammonia	·7
Silica	9·1
Oxide of iron	1·1
Organic matter	63·3
Water	8·0
Loss	3·7
	100·0

Analysis of Soil from Mitcham.

Crops raised: Lavender, etc. Yield of Oil per acre, 8 *lb.*

Carbonate and sulphate of lime	9·0
Carbonate of magnesia	3·8
Alumina	16·3
Silica	20·5
Oxide of iron	2·8
Phosphate of lime	6·0
Nitrate and phosphate of ammonia	3·0
Organic matter	23·7
Water (lost at 212° F.)	12·3
Loss	2·6
	100·0

Analysis of Soil.

Crops raised: Stramonium, Henbane, and Belladonna.

Phosphate of lime	4·5
Carbonate of lime	12·0
Alumina	18·0
Silica	10·0
Carbonate of magnesia	2·1
Oxide of iron	3·5
Chloride of sodium	2·5
Nitrate of ammonia	1·7
Water	20·1
Organic matter	24·0
Loss	1·6
	100·0

Analysis of Soil.

Natural Soil.—Solanum Dulcamara.

Sulphate of lime	2·0
Silica	36·0
Carbonate of lime	14·2
Alumina	9·5
Carbonate of magnesia	1·3
Oxide of iron	5·6
Water	12·4
Organic matter	15·0
Loss	4·0
	100·0

Analysis of Ashes.

Leaves and Stalks of Foxglove.

	Wild.	Transplanted.
Chloride of magnesium	18·0	4·0
Sulphate of lime	26·0	7·2
Phosphate of lime	·4	8·0
Chloride of potassium	16·0	0·9
Chloride of sodium		6·4
Silica and oxide of iron	33·6	64·0
Alumina	·9	9·5
Loss	5·1	
	100·0	100·0

Analysis of Soil.

Referred to in page 213.

Silica	48·0
Oxide of iron	7·2
Alumina	12·9
Sulphate of lime	1·5
Chlorides of potassium and sodium	1·9
Phosphate of lime	3·6
Organic matter	10·9
Water	9·0
Loss	5·0
	100·0

(*The Conference then adjourned.*)

THIRD SITTING.

Thursday, September 7th, 7 P.M.

COMMUNICATION FROM GERMANY.

The President informed the meeting that the Pharmaceutical Conference had been invited to send representatives to an International Pharmaceutical Congress to be held at Brunswick on the 15th, 16th, and 17th of the present month. The Pharmaceutical Society had originally been requested to send deputies to Brunswick, but the council had referred the German Union to the Conference as an association that courted correspondence with societies having similar aims in other countries. Since the reply of the Pharmaceutical Council had been sent to Germany, he (Mr. Deane) had been visited at Clapham by one of the promoters of the Brunswick Congress. Continental engagements would not allow this gentleman to attend the Birmingham meeting, but he had forwarded a letter of invitation, a literal translation of which would now be read :—

"HIGHLY HONOURED ASSEMBLY,—I most extremely regret my inability to accept the invitation of Mr. Henry Deane to be present with you in Birmingham, not that I do not wish to come, but that my journey to certain places—as Paris, Rennes, London, Brussels, Amsterdam, Heilbronn, and Brunswick—is already fixed. Especially, however, am I prevented because the South German Apothecaries' Union holds its general meeting at Heilbronn on the 5th, 6th, and 7th of September, at which time the International Commission (of which I am a member), which was appointed last year at Wiesbaden, to consider the subject of an International Pharmaceutical Congress, will also meet.

"This International Pharmaceutical Congress is no special idea of one man, or of any single body of men, but is called into existence by the general relations of pharmacy at the present time. Pharmacy in all countries requires reformation, if we do not wish to be overridden by the professors of medicine, and to be degraded to the level of a mere trading community. Nearly all the European societies have already appointed their delegates. Among the larger states Great Britain alone remains blank.

"At the French Congress held in Rennes, the following gentlemen were appointed to represent France at the proposed meeting at Brunswick:—Dr. Robinet, formerly President of the Medical Academy of Paris, now Director of the Pharmaceutical Society of Paris, and the President of the Congress in Rennes; Mr. Schauffele, apothecary in Paris, President of the Congress held at Strasburg; and Mr. Giorgino, apothecary in Colmar.

"In Rennes the opinion was universal that there was no doubt but that England would be represented on so important an occasion as the first assembling of an International Pharmaceutical Congress. When the societies in such small states as Denmark and Finland have not neglected to elect representatives to Brunswick, all will ask, Why has Great Britain remained behind?

"It is not necessary that three representatives be chosen, inasmuch as the voting will not be by numbers, but each society will have one vote, whether one or more of its delegates be present. On this account several societies have not sent three delegates.

"I beg, therefore, that the conference in Birmingham will, on its meeting, transmit by telegraph the names of those chosen to represent it to the address of the Head Director of the South German Apothecaries' Union, Dr. Rieckher, Heilbronn, Würtemberg.

"Truly yours,

"DR. BJORKLUND,

"Apothecary and Secretary of the Pharmaceutical Society of St. Petersburg.

"*London, August* 25, 1865."

In the discussion that ensued, it was elicited that the shortness of the notice made it impracticable for any member to accept the invitation to the Congress at Brunswick for the present month. Finally, a resolution proposed by Mr. Brady, and seconded by Dr. Edwards, was carried :—

"That the communication of Dr. Bjorklund be entered upon the Minutes, and that the Executive Committee be requested to keep in view the feasibility of sending delegates to any meeting of the International Pharmaceutical Congress, which may be held in 1866, as well as that of inviting delegates from Germany to the meeting of this Conference in the same year; and that they be empowered to act accordingly."

COMMUNICATION FROM AMERICA.

The General Secretary read the following letter from Mr. P. W. Bedford, Corresponding Secretary of the American Pharmaceutical Association:—

"*American Pharmaceutical Association, New York, July* 27, 1865.

"HENRY DEANE, Esq., President, British Pharmaceutical Conference.

"Dear Sir,—The 'Proceedings' of the British Pharmaceutical Conference were received some months since, and, on behalf of the American Pharmaceutical Association, I am happy to acknowledge also the receipt of a copy of the resolutions passed at the meeting of the Conference, and forwarded by Dr. John Attfield. The expressions of good-will towards our Association will find a hearty response from our members.

"I have forwarded, through Messrs. B. Westermann and Co., a complete set of the 'Proceedings' of this Association (except for the year 1855, which is out of print), which is presented to the British Pharmaceutical Conference, of which you have the honour of being the president. Our Association look with pleasure at the result of the first meeting of your body, and anticipate a career of usefulness in the future.

"May the respective bodies with which we are connected ever continue their endeavours to advance the cause of Pharmacy and its kindred branches, and success be evident in ourselves and those who shall come after us.

"I have the honour to be, dear Sir, yours sincerely,

"P. W. BEDFORD,

"Corresponding Secretary, American Pharmaceutical Association."

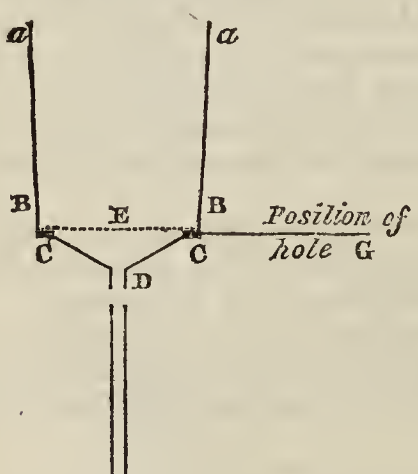
It was moved by Mr. H. Matthews, seconded by Dr. Attfield, and resolved:—

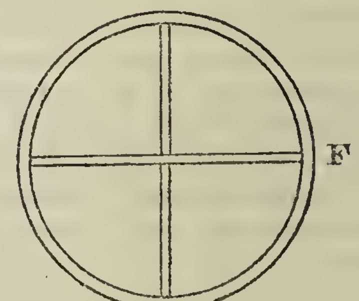
"That the best thanks of the Conference are hereby tendered to the American Pharmaceutical Association for its kind and very acceptable present of a set of its 'Proceedings;' and that the Executive Committee is requested to convey this resolution."

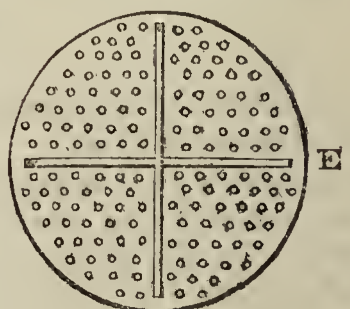
ON A NEW FILTER.

BY MR. G. F. SCHACHT.

The apparatus consists of a cylindrical vessel *a a* B B of pure tin, slightly







smaller in diameter at the bottom than at the top. The smaller end is provided with a ledge, C, from which the bottom slopes to a central spout, D. A perforated plate of tin, E, strengthened at the under side by cross pieces of the same metal, rests upon the ledge. A ring of tin, F, a quarter of an inch thick, strengthened with cross pieces, is also provided. Upon this ring the filtering-medium, flannel, calico, felt, etc. is stretched, and the whole is placed (medium downwards) upon the perforated plate. The ring should be so contrived as to press the filtering-medium tightly against the sides of the vessel, and yet just to rest upon the perforated plate. A small hole, G, is drilled horizontally through the ledge opening into the instrument close under the perforated plate. A tube is then provided of any length from one foot to thirty, and at one extremity is reversed upon itself twice. This tube may be of various materials, but on the whole vulcanized india-rubber is the most convenient. In that case the bent piece at the end should be of some solid substance, such as glass.

To put the apparatus into action, stretch the filtering-material over the ring, F, and press it into its place upon the perforated plate, E. Attach the tube to the spout D, and close the extremity, H, with a cork. Pour in the liquid to be filtered. A portion soon passes through the medium and fills the tube, the air escaping through the small hole G. As soon as the liquid begins to escape at this hole, stop it with a little wax; remove the cork from H, and the action commences.

The dimensions of the instrument and the material of its construction will, of course, vary with the purpose for which it is to be employed. That which I have had made for my own use is of pure tin. It is ten inches high, nine inches in diameter at the larger and eight inches at the smaller end. The ledge is one-third of an inch deep, and the tube of india-rubber is four feet long. I find this elastic tube very convenient, for, as the necessity for pressure is not so urgent at the commencement of the process as subsequently, when the filtering-medium has become choked, the operation can be commenced with efficient result by bringing the receiver to within a few inches of the bottom of the apparatus, and the column can be gradually lengthened and the effect proportionately increased by simply lowering the receiver, to each new position of which the elastic tube readily accommodates itself.

With this instrument I have filtered to perfect brightness eight gallons of turbid solution within the hour, and have had the satisfaction of seeing the last ounce pass through almost as quickly as the first.

7, Regent Place, Clifton.

Dr. Attfield, at the request of the President, explained the action of the filter. He said that the great rapidity with which, according to Mr. Schacht's experiments, liquids passed through the apparatus, and which was the most important feature in the instrument, was quite in accordance with the known laws relating to gravitation, and depended on the depth of the orifice of outflow below the surface of the liquid; the velocity of the current would be ten times greater if the bottom of Mr. Schacht's tube were 100 inches from the upper surface of the liquid than it would if the orifice were only 1 inch below. The action of the filter was similar to an effect known to every one whose house was supplied with water from a cistern in the roof or upper part of the dwelling. The rapidity of flow from the kitchen- or basement-tap of such a system was so much greater than that from a bedroom or attic as to almost force a jug or basin from the hand of any one unaccustomed to that particular arrangement of water supply. That there should be any flow at all from such pipes was simply due to the law of gravitation. So the continued action of a siphon was also referable to gravitation, the velocity of action of any one siphon being dependent on the distance of the orifice of outflow below the level of the liquid operated on. Dr. Attfield also alluded to the effect produced on, and by, the atmosphere in which the operations with the filter, or a water-supply or siphon, might be performed. He did this because some filtering materials might appreciably impede the passage of liquids, in which case the unimpeded gravitation of the liquid in the lower part of Mr. Schacht's ingenious instrument would have a tendency to overcome the pressure of the air from that direction, and thus admit of the pressure of air on the upper surface manifesting itself.

Mr. Evans said that Mr. Schacht's filter closely resembled one that had been patented some years ago by Mr. Britten, of Liverpool, for the filtration of oil.

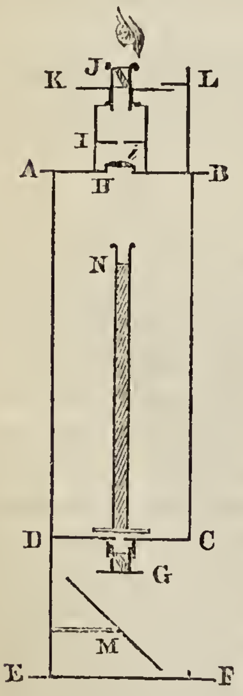
ON THE ADULTERATION OF ESSENTIAL OILS WITH TURPENTINE, AND THE MEANS OF ITS DETECTION.

BY H. SUGDEN EVANS, F.C.S.

It is well known, and admitted on all hands, that the adulteration of essential oils is very extensively practised, both abroad and in this country. Many means have been suggested for the discovery of this fraud, but all have proved more or less defective and unsatisfactory in their results, giving evidence only of the fact of an adulteration having been practised, without any approximation to a determination of the extent or proportion of the adulteration.

A readily applied method of testing, whereby the value of an essential oil can be easily determined, has been much desiderated.

I propose to describe an apparatus I have arranged, and the results I have obtained from its use, showing that by availing ourselves of the power most essential oils possess of rotating the plane of polarization of a beam of polarized light transmitted through them, either to the right-hand or to the left, we may obtain an index of values closely approximating to the actual extent of adulteration or deterioration existing. To those possessing a microscope with polarizing prisms attached, the arrangement of this apparatus or polariscope is simple and inexpensive, as the annexed sketch will explain.



A B E F is an upright box, 2 feet high and 3 inches square in internal measure. The upper part, to D C, is capable of being entirely closed in by a door, B C, and at D C there is a shelf having a hole truly bored in its centre $\frac{1}{8}$ inch in diameter. The lower portion of the box is open in front at C F. Beneath the shelf or stage D C is centrally fixed the Nichols prism, or polarizer of the microscope. M is a plane mirror to reflect a ray of light through the polarizer and body of the apparatus. In the centre of the top of the box at H a plane convex lens of low power is fixed, and above it, at *i*, a perforated stop. The eye-piece, J K, consists of the second or analysing prism of the microscope, J, or better, a double-image prism, set in a circular disk of brass or stiff cardboard, K, the circumference of which is divided into a vernier of 360°. This eye-piece and vernier disk fits into a socket in the tube I, and is capable of easy and true revolution. L is an upright pillar carrying an index hand. Thus arranged, and the prisms adjusted so that the ordinary image of a ray of light transmitted through the apparatus is at its maximum intensity when the index hand points to zero on the vernier disk, the polariscope is ready for use.

The essential oil to be examined is contained in a glass tube, N, which is simply an ordinary piece of glass tubing, $\frac{1}{2}$ inch in diameter, 12 inches long, the cut extremities of which are roughly ground flat; to one end is cemented, with gelatine and honey, a piece of microscope glass. A column of 10 *inches* is accurately measured and the tube with the oil introduced into the upper part of the box, as at N. A ray of light being now transmitted through the apparatus a great change will be found to have taken place, and instead of the point of maximum intensity of the ordinary ray being at zero, it will be found only by turning the eye-piece a greater or smaller number of degrees to the right-hand or the left, the direction being determined by the order in which the colours of the spectrum follow each other, and whether it is necessary to revolve the analyser to the right or the left-hand to obtain the following sequence, viz. violet, red, orange, yellow, green, blue.

Thus the power possessed by the essential oil under examination of rotating the plane of polarized light is measured, and a pretty constant index for comparison is obtained.

Having determined the number of degrees required by a well-authenticated sample of pure oil, as well as of its supposed, or possible adulterants, it becomes a simple matter of calculation to determine the proximate amount of adulteration present; for it is proved by repeated experiments that the amount of rotation recorded is the mean of the combined rotating force of each of the components.

The following tables show the results of a careful examination of essential oils of known purity, and of ordinary commercial qualities.

Table showing the amount of rotatory power of—

Pure *Essential Oil of*		Commercial *Essential Oil of*	
Caraway, English	+212°	Caraway, Foreign	+ 16°
,, Foreign	+156°	Dill ,,	+200°
Cloves, English	+ 9°	Lemon, super	+145°
Dill	+200°	,, fine	+ 78°
Bergamotte	+ 60°	,, medium	+ 36°
Lemon	+150°	,, low	+ 12°
Orange	+ 99°	,, ,,	+ 5
Juniper, English	−155°	Juniper, Foreign	− 9°
Lavender, English	− 26°	Lavender, ,,	− 34°
,, Foreign	− 22°	,, ,,	− 72°
Rosemary	− 35°	Rosemary	− 63°
Turpentine, American	+ 35°	Turpentine	− 68°
,, French	− 89°	,,	− 46°
Peppermint, English α	− 64°	Peppermint, English	− 68°
,, ,, β	− 72°	,, American	− 35°
,, American	− 53°		

The above table has been formed from the results of a large number of experiments, and the numbers assigned to the pure oils are an average of the various results which have been found to vary to a certain limited extent, owing to the age of the oil and other circumstances. A degree or two more or less in a commercial point of view is not a matter of much consequence, the points requiring chief attention in the observation are perfect transparency and uniform temperature; my results have all been noted at the temperature of the laboratory, viz. 68° F.

The principal adulterant of essential oils is spirit or oil of turpentine. On reference to the table, it will be observed that American turpentine rotates the plane of polarization to the right-hand, while Bordeaux turpentine rotates it to the left; hence at first sight a difficulty arises as to the integrity of the test proposed; and again, still further perplexity arises from the fact that turpentine itself has been recently very subject to adulteration with petroleum, which, having no action upon the polarized ray, lowers by dilution the power of rotation enjoyed by the original turpentine; hence the low power indicated in the table in some commercial specimens of turpentine. These variations lead to discrepancies in the results of examinations, but the occasion of them is most readily detected by dilution of the suspected oil with boiling water, when the odour of petroleum, if present, soon manifests itself, and further, the difficulty arising from the contrary powers of rotation of French and American turpentine is resolved, by framing tables of values based upon calculations of both the Bordeaux and American turpentine.

It will generally be found that an oil adulterated on the Continent of Europe, accords, in its reactions with polarized light, with the table framed upon the Bordeaux calculation, while oil adulterated here, in ordinary times when the American turpentine is easily obtainable, corresponds with the table calculated from the American data. Thus a further advantage is presented, that not only is the nature and amount of the adulteration determined, but it is also localized.

The following tables will illustrate the mode of estimating the values of essential oils, and such tables may be multiplied, to refer to nearly every oil. For a considerable period I have employed this mode of valuing essence of lemons, and I have found the indications of the polariscope as indexed in the following table, to accord very accurately with the accredited commercial values of the samples examined, and I consider the process one by which the commercial value of almost any essential oil may be accurately determined within certain very moderate limits of variation.

TABLE OF VALUES.

Essence of Lemons.

American.	Bordeaux.	Value.
+150°	+150°	100
+120°	+ 90°	75
+ 90°	+ 35°	50
+ 60°	− 20°	25
+ 50°	− 50°	10

Oil of Lavender.

American.	Bordeaux.	Value.
− 24°	− 24°	100
− 18°	− 40°	75
+ 11°	− 56°	50
+ 27°	− 75°	25
+ 36°	− 82°	10

Oil of Rosemary.

American.	Bordeaux.	Value.
− 35°	− 35°	100
− 14°	− 51°	75
0°	− 62°	50
+ 16°	− 75°	25
+ 28°	− 83°	10

Liverpool, 1865.

In the course of the discussion, it was stated that experimenters of repute had failed in applying the polariscope to the detection of adulterants in essential oils, chiefly because different specimens of an oil or an adulterant often differed widely in their power of rotating plane polarized rays. Thus Pereira* had found that French turpentine differed from American, not only in degree, but in the direction of rotation, the former being lævo-gyrate, the latter dextro-gyrate.

* Pharmaceutical Journal, vol. v. p. 67.

MUSEUM OF PHARMACY.

Dr. J. B. Edwards introduced the subject of the advantage which might arise from a collection of instruments, utensils, and models of apparatus used in pharmacy. Mr. Joseph Ince had drawn the attention of chemists to the subject, and given practical proof of his desire to form such a collection, by presenting to the Museum of the Liverpool Chemists' Association a practical working model of a chemist's dispensing counter, handsomely designed in oak; and it was his wish that similar contributions should be made, and a large collection formed, both in London and in provincial towns, of such apparatus as would afford to a person about to commence business suitable designs and models for his shop and laboratory. Such a collection, if proper and sufficient space were provided for it, would probably be liberally added to by the medical shopfitters, who now had to contend with the inexperience of their customers, and were, as a rule, less acquainted with the details and various wants of the business than the practical experienced chemist. Such a collection would receive the comments and suggestions of men of experience, and many of the ingenious and inexpensive contrivances of the few would be shared in by dispensers generally. Dr. Edwards thought this subject well deserving of the consideration of members of the Conference, and suggested that the members might assist in the formation of such a collection by presenting to the Pharmaceutical Society, or the Chemists' Association, any contrivances they may have found practically useful, and a saving of labour in the ordinary exercise of their business. Each one of such contributions would have its special value, but the chief one would be that a nucleus would thus soon be formed of an Industrial Pharmaceutical Museum, which would represent the mechanical features of the business in different parts of the country, and afford an important feature in pharmaceutical education.

The President stated his concurrence in the desirability of much that Dr. Edwards had suggested, and regretted that the time at the disposal of the meeting was so nearly exhausted that the subject could not be further discussed. He hoped that it would be brought forward upon a future occasion.

Mr. Savage also expressed his conviction that the subject was well deserving of further consideration.

REPORT ON THE QUANTITY OF ALKALOID IN VARIOUS SPECIMENS OF CITRATE OF IRON AND QUININE (*continued*).

BY MR. J. C. BRAITHWAITE.

In a former paper, I gave the results of my investigation as to the quantity of alkaloid contained in various specimens of this valuable medicine, and expressed my opinion that *quinidine*, if not *cinchonine*, would be found in more than one sample. This opinion has been confirmed by further investigation.

In sample No. 1, containing 1·504 per cent. of quinine (equal to 2·35 per cent. of the citrate), I found neither quinidine nor cinchonine, but the quantity experimented upon was very small.

No. 2, with 1·52 per cent. of quinine (equal to 2·375 per cent. of the citrate), contained neither quinidine nor cinchonine.

These two alkaloids were also absent in No. 3, containing 3·732 per cent. of quinine (equal to 5·831 per cent. of the citrate); in No. 4, containing 4·12 per cent. of quinine (equal to 6·437 per cent. of citrate); in No. 5, containing 4·76 per cent. of quinine (equal to 7·437 per cent. of citrate); and in No. 6, containing 6 per cent. of quinine (equal to 9·375 per cent. of citrate).

No. 7 contained 7·372 per cent. of alkaloid, which, if pure quinine, would represent 11·518 per cent. of the citrate. This sample, however, contained only a mere trace of quinine, the great proportion of alkaloid being *quinidine*, which crystallized out from the ethereal solution. I have reason to believe that *cinchonine* also occurs in this sample, but my investigation is not yet satisfactorily completed.

No. 8 contained 9·292 per cent. of alkaloid, which, were it quinine, would represent 14·518 per cent. of the citrate; but, in this case also, it consisted of *quinidine*, with only a mere trace of quinine. No cinchonine could be detected.

No. 9, containing 11·24 per cent. of quinine (equal to 17·56 per cent. of the citrate), was free from quinidine and cinchonine. The same remark applies to No. 10, containing 12·26 per cent. of quinine (equal to 19·162 per cent. of citrate), and to No. 11, containing 12·94 per cent. of quinine (representing 20·22 per cent. of the citrate).

In No. 12, containing 14·72 per cent. of quinine (equal to 23 per cent. of citrate), a small quantity of *quinidine* was found, but no cinchonine.

Traces of *quinidine*, but none of cinchonine, were also detected in No. 13, containing 14·784 per cent. of quinine (equal to 23·09 per cent. of citrate); in No. 14, containing 14·88 per cent. of quinine (representing 23·25 per cent. of citrate); and, in No. 15, containing 15·84 per cent. of quinine (representing 24·75 per cent. of the citrate).

It had been my intention to have completed the subject in this paper by estimating the quantity of iron contained in each sample, but I have been prevented doing so by indisposition, and must therefore postpone it to a future period. I subjoin the result of my examination of nine more examples, seven of which (Nos. 16, 18, 19, 20, 21, 22, and 23) were kindly forwarded to me by Dr. Attfield.

No. 16. This specimen had become damp, and had run into a mass of a dark olive-green colour. It dissolved readily in water, yielding a solution of a greenish-yellow colour, and somewhat turbid. It had an acid reaction upon test-paper, and possessed only a very slight bitter taste. The precipitate, by ammonia, when dry, was of a brownish colour, with a slight whitish bloom upon it, closely adherent to the paper, and in small quantity only.

As this specimen was difficult to remove from the bottle in which it was contained, and I had a very small quantity of it only, I operated upon the whole, which weighed 62 grains, and obtained 1 grain of quinine, or 1·603 per cent., equal to 2·504 per cent. of the citrate of quinine. This had merely a private mark upon the label, and was one of the samples forwarded to me by Dr. Attfield. It dissolved entirely in ether, yielding a pale yellow solution.

No. 17 occurred in the form of golden-coloured scales, much resembling those of No. 24, but not so bright, being covered with a slight bloom. Exposed to the air at a temperature of 60°, they absorbed moisture, and ran into a gum-like mass firmly adherent to the paper on which they were placed. This specimen dissolved readily in water, yielding a clear yellow solution which had an acid reaction upon test-paper, and was less bitter to the taste than either of the other specimens, except No. 16. The precipitate by ammonia, when dry, shrank to a mere nothing; it had a yellowish-brown colour, and was completely adherent to the paper. From two analyses of twenty-five grains each, I obtained 0·68, 0·68, equal to 2·72 per cent. of quinine, or 4·25 per cent. of citrate of quinine. When treated with ether it was entirely dissolved, yielding a solution of a very pale colour. This preparation is stated upon the label, "to contain 25 per cent. of citrate of quinine," and it was also "*verbally guaranteed* to do so" when purchased. The name of the maker, however, is omitted upon the label.

No. 18 occurred in fine golden scales, much resembling those of No. 24. Exposed to a temperature of 60°, it absorbed moisture and became adherent to the paper upon which it was placed. It dissolved readily in water, yielding a yellowish solution which had an acid reaction upon test-paper, and possessed but slight bitterness, as most of the others.

The precipitate yielded by ammonia was not very copious. It had, when dry, a light brownish colour, with a faint white bloom over the surface, and firmly adhered to the filter.

From two analyses of twenty-five grains each, I obtained 0·69, 0·73; mean 0·71, equal to 2·84 per cent. of quinine, and 4·437 per cent. of citrate of quinine. This was entirely soluble in ether, yielding a solution of a very pale colour.

No. 19. This specimen consisted of very small scales of a dull olive-yellow colour. Exposed to the air at a temperature of 60°, it remained unchanged for a considerable time, but ultimately absorbed moisture and became adherent to the paper upon which it was placed. It dissolved readily in water, yielding a clear yellow solution, which had an acid reaction upon test-paper, but possessed but little bitterness. Only a small quantity of precipitate was thrown down by ammonia, which, when dry, very much resembled that immediately preceding it, being of a light brown colour, with a white bloom over it, and closely adherent to the filter.

From two analyses of 25 grains each, I obtained 1·06, 1·03; mean 1·045, equal to 4·18 per cent. of quinine, and 6·531 per cent. of its citrate.

It dissolved entirely in ammonia, yielding a pale yellow solution.

No. 20 occurred in small granules, and it appeared as if it had been damp and had run together, and been afterwards dried. It had a very dark olive colour, approaching a blackish hue. Exposed to a temperature of 60°, it remained unaffected. It dissolved readily in water, yielding a yellowish solution, which was slightly turbid. It had an acid reaction upon test-paper, and a bitter taste, but of much less intensity than that of Nos. 22 and 23. The precipitate by ammonia, when dry, was not very bulky; it had a very dark colour, and separated very readily from the filter.

From two analyses of 25 grains each, I obtained 1·12, 1·09; mean 1·105, equal to 4·42 per cent. of quinine, and 6·906 per cent. of its citrate.

It was almost entirely soluble in ether, yielding a solution of a yellowish colour, but less deep than the two preceding ones.

No. 21. This sample was composed of small granules of a dark olive-brown colour, intermixed with a few small scales of a somewhat lighter colour. Had apparently got damp and been dried. Exposed to the air at a temperature of 60°, it remained unchanged. It dissolved readily in water, yielding a solution of somewhat deeper colour than either of the preceding, slightly turbid, having an acid reaction upon test-paper and an intensely bitter taste, but not chalybeate. With ammonia it yielded a copious precipitate, which, when dry, had a dark-brown colour with a white bloom, and a very resinous appearance. From two analyses of 25 grains each, I obtained 3·25, 3·22; mean 3·235, equal to 12·94 per cent. of quinine, and 20·218 per cent. of its citrate. This was almost entirely soluble in ether, and the solution closely resembled those of Nos. 22 and 23 in colour.

No. 22. This consisted of bright golden-coloured scales, rather darker in colour than No. 24. Exposed to the air at a temperature of 60°, it was unaffected. It dissolved very readily in water, yielding a somewhat turbid yellowish solution with an acid reaction upon test-paper, and a strongly bitter taste, but was not very chalybeate. The precipitate thrown down by ammonia was copious, and when dried had a brownish resinous appearance, its surface being covered with a white bloom, and was readily separable from the filter. From two analyses of 25 grains each I obtained 3·46, 3·54; mean 3·5, equal to 14 per cent. of quinine, and 21·87 per cent. of its citrate. It was almost entirely soluble in ether, yielding a yellowish solution.

No. 23 was composed of golden-olive scales having a greenish shade. Exposed to the air at the temperature of 60°, it was unaffected. It dissolved readily in water, yielding a yellowish solution much the same as the preceding, but not quite so clear, and having an acid reaction upon test-paper, and a strongly bitter but not chalybeate taste. The precipitate by ammonia much resembled that of No. 22 in appearance, having a resinous aspect and a brownish colour, covered with a white bloom, and separated pretty readily from the paper. From two analyses of 25 grains each, I obtained 3·76, 3·76, equal to 15·04 per cent. of quinine, or 23·5 of its citrate. It was almost entirely soluble in ammonia, and closely resembled the preceding in the colour of its ethereal solution.

No. 24 occurred in the form of very bright fine golden green scales. Exposed to the air at a temperature of 60° it remained unaltered. It dissolved very readily in water, yielding a fine golden-yellow solution, which was beautifully clear, and had an acid reaction upon test-paper. It was intensely bitter, but not chalybeate. Ammonia produced a very copious precipitate, which, when dry, was of a light-brown colour, and of a very resinous appearance. From two analyses of twenty-five grains each I obtained 4·2, 4·18, mean 4·19, equal to 16·72 per cent. of quinine, or 26·75 per cent. of its citrate. This is entirely soluble in ammonia, yielding an almost clear solution. I may mention that this specimen was prepared by my own formula, a little additional quinine having been purposely added, to ascertain if it were possible to combine a greater amount of citrate of quinine than 25 per cent., and at the same time retain brilliancy of colour and appearance, and ready solubility of the medicine.

54, *Kentish Town Road, N.W.*

ON COTTON-SEED OIL, AND ITS DETECTION WHEN MIXED WITH OTHER OILS.

BY R. REYNOLDS, F.C.S.

In the year 1785 the Society for the Encouragement of Arts and Commerce offered a prize for the successful manufacture of oil from cotton-seed, but it has not yet been awarded. The difficulties in purifying the expressed oil seem to have been insuperable for a long while, though for several years past the oil has been coming into use in the United States. In our own country trifling quantities have been produced during the last dozen years or so, but at the present moment a very considerable quantity is being expressed in England.

There is too much reason to believe that nearly the whole of this is used in the sophistication of oils of older repute. The probability that the supply will now continue and increase is especially indicated by a consideration of the source of the oil. The weight of seed yielded by each cotton plant is about three times as great as the cotton obtained from it, and up to the present time nearly the whole of this seed has been wasted, or returned to the soil as a fertilizer. The present price of the refined oil is less than 3*s*. per gallon, and, considering the large proportion of seed that has yet to be utilized, it is probable that it will long continue to be the cheapest fixed oil on the market. Hence the desirability of our giving some attention to a substance which is pretty sure to present itself to us in our daily avocations in some shape or other.

As might have been expected, cotton-seed oil has been noticed in the literature of our American brethren. Thus, in 1856, Mr. Wayne brought it under the notice of the American Pharmaceutical Association, and in 1861 it formed the subject of an inaugural essay by Mr. Weatherley (Pharm. Journ. N.S. vol. iii. p. 30).

Mr. Weatherley's essay well deserves attention. The author repudiates much of the discredit thrown upon the oil on account of its asserted drying qualities, and says that it answers well for both burning and lubricating.

Mr. Weatherley made some experiments in substituting "winter-bleached" cotton-seed oil for olive or almond oils, in various pharmaceutical preparations. He states that cold cream, spermaceti ointment, citrine ointment, and some liniments were so prepared, and fully equalled the results of the officinal formulæ.

In England, Dr. Adriani has studied the properties of this oil (Chem. News, Jan. 7, 1865). He states that the crushed seed is heated to about 180° Fahr., and then pressed, when 15 to 18 per cent. of a dark brown-red oil is obtained. The specific gravity is ·930 or ·931, and in this respect, as well as in taste, odour, and drying qualities, it has much resemblance to linseed oil, from which, however, it differs in its darker colour. Dr. Adriani has shown that the dark brown-red colour possessed by the oil does not pre-exist in the seed, but that it is the result of the oxidation of a yellowish-green principle that is found in the seed, and which may be extracted from it with unchanged colour if precautions to exclude the air be adopted. Much attention has been given in some quarters to the utilization of this principle as a dyeing agent, but without successful results.

The operation of refining the oil consists chiefly in heating it with a weak solution of caustic potash or soda (the former by preference). A preliminary treatment of the oil by boiling water, to remove mucilaginous matters, much facilitates the operation. If the crude oil be well agitated with solution of potash without the application of heat, the mixture, after repose, will yield a yellow layer of "refined oil" floating upon an aqueous solution that is nearly black, from the colouring matter abstracted from the oil. A singular purple-coloured film may also be produced upon the surface. The loss in refining is stated at about 15 per cent.

I have only to add a few remarks upon the detection of this oil when mixed with olive oil. A well-known chemist, whom I regard as the highest authority upon the subject of the adulteration of oils, tells me that he does not know of a test for this purpose.

The experiments which I have made induce me to regard the nitrate of mercury test as affording sufficiently clear reactions to enable us to find this oil when mixed with olive oil.

I have used Pontet's test as follows:—6 parts of mercury are dissolved in 7½ parts, by weight, of nitric acid 1·36 without the application of heat, and form the test solution. The tubes for making these experiments are merely strong test-tubes of 7 inches in length, and holding about a fluid ounce. They are roughly graduated by pouring in 30 minims of water and scratching a line upon the glass; another line is made at the point reached when a total of 6 drachms of water have been poured in. The lower line is marked "test," the upper one "oil." Pour in first the test to its mark, and fill up with the suspected oil to the other line; shake well and set aside, shaking again about an hour afterwards. In from three to twelve hours according to the temperature, etc., a genuine olive oil will have solidified entirely, the product after the latter interval being quite hard when touched by a glass rod. Cotton-seed oil, when similarly treated, will not solidify, but remains fluid. A mixture of 25 parts of cotton-seed oil with 75 parts of olive oil gives an intermediate condition. The contents of the tube become solid, but if a little be taken out with a glass rod, it is found to be soft, pasty, and without any friable character. On the other hand, when pure olive oil is so treated, the product is hard, friable, and not pasty. Comparative trials should always be made, and caution exercised in accepting the apparent conclusions. Where only 12½ per cent. of cotton-seed oil is present, the reactions are not so distinct as with 25 per cent., but I consider them usually sufficient to decide the case.

I believe that when the adulteration of olive oil is so prevalent as at the present time it is the interest of members of the drug trade to use this test themselves, and also, in many cases, to inform large consumers how easily it is applied.

TANNIN IN BRITISH GALLS.

BY WILLIAM JUDD, F.C.S.

Having noticed for some three or four years past the large quantity of galls on the oaks in this neighbourhood, the question naturally occurred, Could not these galls be turned to some practical account? When, therefore, this subject was proposed for investigation by the British Pharmaceutical Conference, I gladly undertook to do what I could to set the matter at rest. Great differences of opinion appear to exist as to the value of these galls, and those who have examined them have arrived at very various conclusions. This may have been partly attributable to the different ages of the galls in which the tannin was estimated.

The questions proposed are, "What is the quantity of tannin in English galls (*Cynips Quercus-petioli*) at different stages of their growth? Can they, at either of these periods, be employed economically as a substitute for the nut-galls of commerce?"

The reply to the second question must obviously depend on the results obtained in investigating the first.

My first aim was to ascertain the most trustworthy and simple process for estimating the quantity of tannin present. The gelatine process being open to many objections, I endeavoured to substitute some other. The plan recommended by Mr. Marriage in Pharmaceutical Journal, vol. iii. p. 509, with ammonio-sulphate of copper, was inadmissible on account of the dense colour of the fluid obtained by percolating or macerating the galls. The gallo-tannates of lead and antimony are said by Miller to be insoluble, and I attempted to found a process on this fact, but without success. These compounds are not so insoluble as stated. Many other plans were tried, but with them all there was some difficulty or obstacle that rendered the process useless. I was obliged, at last, to adopt the gelatine process, modified by the addition of alum, as suggested by Müller.

It is unnecessary to detail all the experiments; suffice it to say, the following results are the mean of several trials, the galls also being exhausted in various ways:—

I. I first examined a sample of old galls, which had hung on the trees till Christmas, of course perforated by the escape of the fly. They were found to contain an average of 15·97 per cent. of tannin.

II. Galls gathered when mature (in the month of August), not perforated. These were found to contain 17·65 per cent. of tannin.

III. Galls gathered when about half developed and dried, producing a more dense and shrivelled gall. These contained 13·4 per cent. of tannin. It appears from this that the mature galls, gathered before the escape of the fly, contain, as might have been expected, the largest quantity of tannin.

With these data we may turn to the second question, "Can they, at either of these periods, be employed economically as a substitute for the nut-galls of commerce?"

The quantity of tannin contained in Aleppo galls, as stated by various authors, ranges from 30 to 65 per cent., which is obviously much more than that contained in these British galls; yet, with so considerable a percentage of tannin, there are probably some uses to which they may be advantageously applied. I have not yet been able to make any experiments with a view to ascertain if gallic or tannic acids may be commercially prepared from them. I will, however, if deemed desirable, take up that point and report thereon at the next meeting of the Conference.

One purpose for which these galls may undoubtedly be used is that of dyeing; and as large quantities of Aleppo galls are constantly in demand for this purpose, British galls would here find one of their most important applications. Another use would be in making ink. I have made some ink from a formula known as Wollaston's, using the same weight of British as of Aleppo galls. The product is a fair average ink, with which this paper is written. I used the old perforated galls; had I used a larger quantity of these, or used some of the mature galls, it would probably have made a better ink. No other tannin-yielding material was added. They might also be used for some kinds of tanning. Oak-bark, according to Davy, yields from 5 to 7 per cent. of tannin, with which these galls stand in favourable comparison, and they might, in some cases, be advantageously substituted.

The quantity of these galls in some districts is very considerable, and their collection in quantity would be easy.

In conclusion, I may advert to a peculiarity I am unable to explain, which is the dense colour of an aqueous solution of the galls, the galls themselves being light in colour and very porous in texture.

Dr. Attfield said he had just received a letter from Dr. Wilmot, of Tunbridge Wells, confirmatory of Mr. Judd's results. From a rough examination Dr. Wilmot had found a large quantity of tannin could be obtained from English galls, but that they must be gathered at a particular period of growth. He hoped that if we were to suffer from a pest which was certainly on the increase, some good might be derived from it, and some check in its advance be furnished by the very means whereby that good was to be obtained.

ON ITALIAN CASTOR OIL.

Dr. Attfield stated that Mr. Henry Groves, of Florence, was engaged in ascertaining for the Conference the cause of the absence in Italian castor oil of that unpleasant taste characteristic of the chief commercial varieties of that well-known medicine, and would probably send a paper on the subject to the next meeting in 1866. Meanwhile, a recent pupil, Mr. Phillips, now of Naples, had sent him some remarks on the matter, which might be read at the present meeting, and would thus probably aid Mr. Groves in his investigation. Mr. Phillips's letter was as follows:—

14, *Strada S. Carlo, Naples.*

Dear Sir,—Seeing that the question No. 131 had been accepted by Mr. H. Groves, I thought it unnecessary to trouble you with any further remarks on the subject, nevertheless it has occurred to me, even at this late moment, that my promise ought to be kept, although I can offer but little information on the subject in question.

The castor-oil plant here attains a height of from 10 to 16 feet, and is generally biennial, sometimes triennial; the seeds, which are ripe in the middle of autumn, are generally smaller than the East Indian; some are of a uniform dark colour, others very prettily streaked.

The oil is generally prepared during the following summer, the warmth of the weather causing a more abundant yield of oil. The outer skin is removed by cracking the seeds with a hammer on a marble slab, which operation is performed by women, the skins being blown away by a kind of fan; they are then placed in the press which is lined with filtering-paper, pressure is applied very gently, and extends over several days, the oil is again filtered as it runs from the press, and is set aside that any little fecula still remaining may deposit. Exposure to the sun is always avoided, from its tendency to produce rancidity. This oil is of a very pale colour, nearly odourless, and possesses hardly any taste. Unfortunately, the wholesale price of this oil is the same as the retail price of much that is sold in England, therefore very little can find its way into the English market.

The variety of Italian castor oil prepared for exportation is made at all seasons of the year; very little care is taken in decorticating the seeds, which are triturated between stones into a paste before pressing, and steam heat applied during the process. Frequently they are beaten with the skins into a paste, and the oil then filtered through paper or flannel after having been mixed with animal charcoal, the filtering being conducted in a heated room.

I have learnt from good authority that large quantities of East Indian seed are imported into Italy, and furnish much of the oil exported from this country.

The oil last mentioned has a much stronger odour, and more acrid taste, and is also more coloured than the first; but is less disagreeable (when from Italian seeds) than the Indian or American oils. With regard to the real question, as to the cause of the less nauseous taste of the "Italian Oil," I can only ascribe it to the fact of the oil being prepared from fresh seeds, well decorticated, often not bruised, and without heat. The oil obtained from seeds three or four years old has a much stronger odour and taste, in fact the oil keeps sweet much longer when expressed than in the seeds.

The variety exported, if prepared from fresh seeds and without much heat, enjoys to some extent the same properties, and is more active than the finest variety.

The seeds themselves are sometimes used as a purgative, two seeds grated and taken in water having the same effect as an ounce of oil.

The oil is often taken in the form of an emulsion. 1 oz. with 1 oz. of syrup, and $\frac{1}{4}$ oz. powdered gum are well mixed in a dry mortar, stirring always in the same direction. When it becomes sticky, a little peppermint or orange-flower water is added, and 4 oz. distilled water gradually stirred in. This forms a most elegant emulsion, with scarcely the slightest taste of the oil, it is called here, "Olio di Ricini a l'Inglese."

I fear that little service will be rendered to the Conference by this very imperfect description of the Italian process for obtaining the oil, and must apologize for my neglect in not writing sooner. If at any time I can furnish you with any information respecting the processes here employed in the production of pharmaceutical products, I shall be most happy to do so.

With much respect,

Believe me, dear Sir, yours truly,

JOHN PHILLIPS.

REPORT ON THE BEST EXCIPIENTS FOR FORMING THE RESINS OF JALAP AND SCAMMONY IN PILLS.

BY MR. T. J. HASSELBY.

A doubt having been stated as to the applicability of these resins being formed into pills, the question was undertaken by the writer for examination. There have been difficulties met with, but only such as are common to the class of articles to which the above resins belong, and they are surmountable by a little tact and patience on the part of any dispenser. The excipients tried were, glycerine and starch, mucilage, rectified spirit, Castile soap and water, Castile soap and spirit. Of these, the most suitable were rectified spirit or mucilage. Twenty grains of resin was used each time. At first the pills were too soft, and lost their shape, but on repeating the experiments with a less quantity of the excipient, success was easily met with. A warm mortar, or slab, was found to facilitate the operation.

After standing for several weeks, the pills were examined. Those made with soap and water had then become firm, and had less water been used, or had they been heated after mixing, they would have ranked nearly equal with spirit or mucilage.

Resin of Jalap.

First experiment:—20 grains of resin treated with glycerine. The mass crumbled, afterwards agglutinated, and the glycerine exuded. It weighed, after having been placed on paper, and then scraped off, 28 grains. Estimated loss of glycerine on paper, 2 or 3 grains. 2 grains starch added. After mixing up it did not roll well, the glycerine still exuded. The weight was 29 grains, and the pills lost shape and became flat.

Second experiment on 20 grains of resin:—Fresh mucilage (P.L.) was used. It made up well. The weight of pills after rolling, etc., was 24 grains, the mortar being carefully cleaned of mess. Estimated amount of mucilage used, 6 grains.

Third experiment:—To 20 grains of resin and 3 grains of powdered Castile soap, three drops of water were added. The weight of mass from the mortar was 25 grains. Lost shape, but afterwards became firm.

Fourth experiment:—To 20 grains of resin and 4 of soap, 3 drops of spirit of wine were added. The weight of the mass was 23 grains. It did not keep its shape after being rolled out.

Fifth experiment:—To 20 grains of resin 4 drops of spirit of wine were added, and the mass rolled out quickly. The pills took form easily, and retained it.

Patent Scammony.

First experiment:—To 20 grains of resin 4 drops of mucilage were added. The mass was too soft, it lost shape. On being worked on a warm slab, and then rolled off, the pills took a good shape, which they have since retained.

Second experiment:—To 20 grains of resin 3 drops of spirit were added. It worked up easily, was rather soft at first, but then hardened, and is keeping its shape well.

As these two experiments succeeded so well, no others were tried.

The President said that, as a general principle, he must object both to the use of spirit and of mucilage as excipients for pills. The flinty hardness which they were apt to cause was a serious evil.

Dr. Attfield said that this paper showed the uselessness of the extract of jalap of the British Pharmacopœia. It had been admitted (Garrod, Med. Times and Gazette, 1846, vol. i. p. 360) that that extract was simply jalap resin with a natural excipient. From this paper it must be clear to everybody, as it already was to pharmaceutists, that any dispenser knowing his business could make jalap resin into pills in a far better way than by the method gratuitously given in the British Pharmacopœia, under the dignified name of *Extractum Jalapæ.*

CONVERSAZIONE.

On Friday evening, September 8th, the Birmingham members of the Conference invited the other Members to a Conversazione in the Odd Fellows'

Hall. Among those present were—Dr. De Vry, of Rotterdam; Drs. Fleming, Hill, Warden, Solomon, Parkes, Miller, and Hinds, of Birmingham; Mr. Bremridge, Secretary of the Pharmaceutical Society, London; Messrs. Selby, Langston Parker, and Davis, surgeons, of Birmingham; most of the Officers of the Conference; Mr. A. M. Chance, and other local manufacturers; and ladies and gentlemen to the number of about two hundred. Three sides of the large hall were occupied by long tables, in some parts two-deep, loaded with articles, chiefly of a character to interest chemists and druggists, yet a large number representing the fine and industrial arts; the fourth, by a *buffet* on a liberal scale. This room, which, from its large size, had had during the attendance of the forty to eighty members at the sittings of the Conference an aspect of cheerlessness which even the unpleasantly powerful solar rays had never entirely dispelled, was now only comfortably full. Both it and an adjacent smaller hall, which had been fitted up by the local committee as a drawing- and writing-room for the use of the members during the week of meeting, were tastefully decorated with flowers.

Altogether the conversazione was of a most agreeable character. At intervals short lectures, occupying only a few minutes, were delivered, each alternating with a musical performance on a six-octave set of musical glasses of great purity of tone by Mr. Bird and his son.

Mr. Thomas Barclay read a brief "Report on the Chemical Manufactures of Birmingham and the District." The author commenced by referring to the articles manufactured by Chance, Brothers, and Co., of Oldbury. He called attention to their samples illustrating the manufacture of carbonate of soda, their sample of purified soda ash used in the manufacture of plate glass, and their sample of bicarbonate of soda prepared especially for pharmaceutical purposes. He then referred to the phosphorus, both amorphous and ordinary, the chlorate of potash, and the pure precipitated sulphur of Messrs. Albright and Wilsons, of Oldbury. The samples of the common mineral acids, shown by Messrs. Shorthouse, of Birmingham, represented an extensive manufacture of the district. The beautiful specimen of Roman vitriol, shown by Messrs. Hickling, and the samples of nitrate of strontia and baryta from Mr. Winder, also represented the manufactures of Birmingham. The large and well-formed crystals of citric acid were from the factory of Messrs. J. and E. Sturge, of Birmingham, who owned a plantation in Montserrat where they cultivated upwards of three hundred acres of lime-trees, and whence they obtained the concentrated lime-juice used in the manufacture. Cyanide of potassium was manufactured on a very large scale in Birmingham for the use of the electro-metallurgists. The samples exhibited were sent by Messrs. Adams. One specimen of grey cyanide was of remarkable beauty, and though a crude product was nearly pure, containing 94 per cent. of the pure salt. This was obtained by fusing prussiate of potash in a close vessel. The pure acids, the acetates of potash, soda, and lead, nitrate and phosphate of soda, the iodides and bromides of potassium, ammonium, and cadmium, and a variety of other articles were also manufactured in the district. Messrs. Clay and Newman, of the Salt Works, Droitwich, had sent specimens illustrating their manufacture, including two forms of crystals, one, called the "hopper crystal," being very curious. In conclusion the author remarked that in naming those who had contributed to the collection, he did not wish to give them undue prominence, as there were many other well-known makers in the district.

At nine o'clock the visitors were invited to pass into a room to listen to a lecture—

"On the Electric Discharge," by Dr. J. B. Edwards. Having explained and exhibited the ordinary forms of the discharge, Dr. Edwards performed a beautiful series of experiments with tubes containing different gases in a highly rarefied condition. The discharge from the induction coil, on being passed through these tubes, was variously modified, and produced the most striking effects. The action of magnetism on the discharge was illustrated by a very beautiful experiment. The fluorescence of a solution of quinine when exposed to the light of the discharge was also exhibited. The speaker concluded by showing the intimate relation existing between electrical, physical, and chemical disturbance, and the mutual convertibility of all forms of force.

Mr. THONGER, at the request of the President, gave a short description of his patented caution label, for the prevention of accidental poisoning. As is now well known, it consists of the ordinary retail or dispensing label, with a broad border of sand-paper. A dispenser, patient, or nurse feeling such a rough label on laying hold of the bottle, is thereby reminded that the contents of the latter are of a dangerous character. The labels were of all shapes and sizes, and seemed as convenient for the medical practitioner and his patients as for the chemist and druggist and his customers.

At about ten o'clock the gossiping groups of philosophers were collectively addressed by the President. He begged to propose a vote of thanks to the Birmingham members for the hearty manner in which they had performed the duties of hosts. It was a pleasant thing thus to see the chemists and druggists of a great town vying with each other in such verbal and practical expressions of goodwill and friendship as all had met with that evening.

Dr. ATTFIELD seconded the resolution. He was glad to have that opportunity, both personally and officially, of thanking those of the Birmingham members who had acted as a local committee for the arrangement of the business and social meetings of the Conference. He and Mr. Reynolds could not have accomplished their duties as Secretaries had it not been for the substantial and valuable co-operation they had received. He begged to associate with the resolution the name of Mr. Dymond, with whom, as Acting Local Secretary in the absence, from illness, of Mr. W. Southall, jun., he had necessarily been brought more into contact than with some other members of the Committee.

The resolution having been carried by acclamation, Mr. Dymond briefly acknowledged it.

Among the articles displayed on the tables were the following:—

Messrs. Chance, Brothers, and Co., fine specimens of crystals of carbonate of soda, sesquicarbonate of ammonia, and sal ammoniac.

Mr. T. Lucas, of Birmingham, microscopic objects, and fine specimens of sulphate of magnesia crystals.

Messrs. Robert Field and Son, of Birmingham, a display of microscopes, exhibiting a variety of physiological preparations.

Mr. Timothy Morris, of Birmingham, a voltaic battery, galvanic machines, magneto-electric machines, magnets, and samples of submarine electric cables.

Mr. H. Deane, of London, specimens of tea-seed and tea-seed oil, seeds and oil of *Argemone Mexicana*, and specimens of corrosive sublimate, which had been used for the poisoning of a child, and the means of detection under a microscope.

Messrs. Southall, Son, and Dymond, of Birmingham, specimens of iodides and bromides of potassium, ammonium, and cadmium.

Mr. R. Reynolds, of Leeds, specimens illustrating a paper on cotton-seed oil, and its detection when mixed with other oils.

Dr. Attfield, of London, specimens illustrating a paper on aqueous and spirituous solutions of perchloride of iron.

Mr. J. Tuck, of Wilton, near Salisbury, specimens illustrating a paper on Eschwege's patent wood-naphtha, methylic alcohol, etc.

Mr. J. J. Horton, jun., of Birmingham, a case of reptiles.

Mr. Thomas Barclay, of Birmingham, a number of the most important chemical manufactures of Birmingham and the district.

Mr. J. Green, of Droitwich, specimens of Droitwich brine, rock salt, and fine crystallized salt.

Messrs. J. and E. Sturge, of Birmingham, a fine specimen of citric acid.

Messrs. J. and C. Pumphrey, of Birmingham, a variety of stereographs, etc.

Messrs. Mawson and Swan, of Newcastle-on-Tyne, photographs taken by the patent carbon process.

Mr. F. B. Benger, of Manchester, specimens illustrating a new mode proposed for the manufacture of blue pill.

Mr. George Johnson, of Birmingham, specimens illustrating a paper on the precipitate formed in ipecacuanha wine.

Mr. Alfred Bird, of Birmingham, a six-octave set of harmonized glass bowls, a magnetic coil, with bar to sustain great weights, a vibrating bar of copper, an ingot of lead, and some samples of tartaric acid and carbonate of soda, purchased in Paris.

Mr. Alexander Parkes, of Birmingham, exhibited "Parkesine" in its various stages, as applied to the arts and manufactures.

Mr. E. Hollier, of Dudley, a selection of trilobites from the Wenlock Shale and Limestone, Dudley, consisting of choice and unique specimens of the *Calymenæ Blumenbachii* (Dudley Locusts), different varieties of *Phacops*, *Encrinurus*, *Lichas*, *Homalonotus*, etc., including the celebrated *Homalonotus delphinacephalus*, from the cabinet of S. H. Blackwell, Esq. A few specimens of new and beautiful crinoids were also exhibited.

J. Lancaster, of Birmingham, exhibited a stand of stereoscopic slides.

G. Gore, Esq., of Birmingham, sent a case of many new, rare, and expensive chemicals and minerals.

Mr. E. W. Ball, of Birmingham, exhibited Gore's patent gas furnaces, for producing high temperatures by the combustion of numerous alternate layers of air, and of a mixture of gas and air; also an electro-magnetic engine, etc.

Mr. H. Sugden Evans, of Liverpool, a polariscope for determining the value of essential oils.

Mr. M. Ash, of Birmingham, a variety of philosophical instruments.

Mr. G. Thonger, of Birmingham, exhibited his patent poison labels, and a variety of photographs.

Mr. E. Wheeler, of London, microscopes and microscopic objects, including *Trichinis spiralis*, *Entozoa folliculorum*, and *Tæne Sola*, besides a variety of English, French, and German anatomical preparations.

Mr. Browning, of London, a display of microscopes, with Mr. Sorby's application of the spectroscope, for the detection of blood-stains.

Mr. S. U. Jones, of Leamington, exhibited some beautiful transparent injections, human and animal; also, a number of the new American pharmaceutical preparations, etc.

Mr. E. Mander, of Birmingham, a revolving stereoscopic stand and transparent slides.

Messrs. Johnson, Matthey, and Co., of London, a platinum boiler, for the concentration of sulphuric acid; a platinum still; a nozzle for the tube used by workmen in glass-blowing, covered with platinum; a platinum ingot, value £1125; and a gold and platinum series, from the various countries where they are found. They also contributed rough castings of magnesium, as well as specimens of wire and tape of the same metal.

Mr. Croucher, of Birmingham, showed a patent flexible diaphragm, for the preservation of liquids in casks, and patent electric valves for regulating the passage of gas, air, and other fluids.

Mr. Sadler, of Birmingham, a collection of magnetic, chemical, photographic, and pneumatic apparatus.

Mr. T. G. Musson, of Birmingham, contributed a dissecting microscope and improved frog plate, pride-of-India and castor-oil plants, case of foreign birds, palmetto baskets, etc., two pictures, sea fan, sea porcupine, marbled angle (a rare fish), etc.

Mr. Geo. Ensell, glass and stone bottle manufacturer, a variety of glass vases, Parian busts, large richly-cut toilet bottles, and opaque glass ointment and confection jars, case of foreign birds, etc.

Mr. E. Snape supplied a fine collection of pictures.

The Supper.

At ten o'clock about forty of the members sat down to supper at the Acorn Hotel, and thus pleasantly terminated a meeting which was considered by all to have been highly successful, both in regard to the number and practical value of the scientific papers read at the different sittings, and in the promotion of that good feeling, friendship, and mutual respect which should ever exist among those following the trade and profession of pharmacy.

Officers and Place of Meeting for 1865-6.

At the final sitting of the Conference, held on September the 12th, at 17, Bull Street, the place of meeting for next year was determined to be Nottingham, in the month of September.

On the motion of Mr. Brady, seconded by Mr. Dymond, it was resolved "that gentlemen who have filled the office of President shall be created Vice-Presidents and *ex-officio* members of the Executive Committee."

The following were elected as officers for the year 1865-6:—

President—Professor Bentley, F.L.S., M.R.C.S. Eng.

Vice-President, (who has filled the office of President)—Henry Deane, F.L.S.

Vice-Presidents—J. B. Edwards, Ph.D., F.C.S., Liverpool; D. Hanbury, F.L.S., London; S. Parr, Nottingham; W. W. Stoddart, Bristol.

Treasurer—H. B. Brady, F.L.S., Newcastle-on-Tyne.

General Secretaries—John Attfield, Ph.D., F.C.S., 17, Bloomsbury Square, London; R. Reynolds, F.C.S., 13, Briggate, Leeds.

Local Secretary—J. H. Atherton, Long Row, Nottingham.

Committee—J. C. Brough, Stockwell, S.; George Dymond, Birmingham; S. Gale, F.C.S., 338, Oxford Street, London, W.; T. B. Groves, F.C.S., Weymouth; A. F. Haselden, 18, Conduit Street, London; S. U. Jones, Leamington; B. S. Proctor, Newcastle-on-Tyne; G. F. Schacht, Clifton.

Auditors—J. Churchill, Birmingham; Edward Snape, Birmingham.

It was left to the Executive Committee to determine the exact time of meeting in 1866, and to elect one other member of committee.

BRITISH ASSOCIATION.

The thirty-fifth meeting of the British Association commenced at Birmingham on Wednesday, September 6. The General Committee Meeting was thinly attended, in consequence of the attraction at the opening of the Free Library, which occurred at the same hour. After the reading of the report of the Council, and the reports of the various Committees, the President, Professor Phillips, delivered his address, the report of which our space will not admit. The following is a list of the Officers of the Chemical Section:—

President—Prof. W. A. Miller.

Vice-Presidents—A. W. Williamson, J. H. Gladstone, Sir R. Kane, G. Shaw, Dr. A. W. Hofmann.

Secretaries—A. Vernon Harcourt, Prof. Wanklyn, H. Adkins, A. Winkler Wills.

Committee—F. A. Abel, T. Andrews, D. Atkinson, Dr. Attfield, J. Archer, J. Lowthian Bell, R. Biggs, Crace Calvert, R. C. Clapham, W. Crookes, J. Dale, sen., C. G. B. Daubeny, H. Deane, J. Baker Edwards, T. Fairley, D. Forbes, Prof. G. C. Foster, W. Francis, E. Frankland, J. P. Gassiot, G. Gore, W. R. Grove, Rev. W. Vernon Harcourt, W. E. Heathfield, A. Hill, F. M. Jennings, S. Macadam, W. Makins, A. Matthiessen, Hugo Miller, H. M. Noad, B. H. Paul, Dr. D. S. Price, W. De La Rue, W. J. Russell, Trenham Reeks, T. H. Rowney, Dr. Schunck, Wentworth L. Scott, Maxwell Simpson, R. Angus Smith, H. C. Sorby, J. C. Spiller, C. Tomlinson, Prof. Voelcker, Dr. J. E. De Vry, F. Wrightson.

Thursday.

The President (Prof. W. A. Miller) said:—"Amongst the problems which have, for some time past, been engaging the minds of philosophical chemists, few are of greater interest than those connected with the idea of the atomicity of the elements. It is well known that chemists now distinguish between the *atomic weight* and the *equivalent* of an element; also that, owing to the labours of many distinguished men, amongst whom the names of Williamson, Kekulé, Odling, Cannizzaro, and Wurtz are the most prominent, a classification of the elements into families has been made; and that this classification rests upon what is known as the *atomicity* of the elements. One group of the elements, like potassium and chlorine, is regarded as *monatomic*, or usually equivalent in functions to one atom of hydrogen; a second, like oxygen and sulphur, is *diatomic*, or equivalent in functions to two atoms of hydrogen; a third group, like nitrogen, phosphorus, and arsenic, is *triatomic*, or equivalent for the most part to three atoms of hydrogen; while a fourth group, like carbon and silicon, is *tetratomic*, or equivalent in functions to four atoms of hydrogen, and so on. It would lead us too much into detail were I to attempt to show how this idea of the atomicity of the elements has been applied, and is still in process of application, to the study of the formation of compounds in general, how it endeavours to explain the existence of a limit to their number, and how it even teaches us to anticipate their possible varieties. Among the subjects connected with its development is its bearing upon *isomerism*, or the remarkable fact of the existence in many cases of two or more bodies of different properties, but yet composed of the same elements, combined in identically the same proportions. Upon this subject, which, at our last Meeting, was characterized by Dr. Odling as the chemical problem of the day, a suggestive theoretical paper was published, about twelve months ago, by Dr. Crum Brown; whilst, in the same direction, Cahours, Kekulé, Beilstein, Fittig, and several other chemists, have published valuable experimental researches. Inquiries of this kind are now acquiring special importance from the numerous cases of the formation of such isomeric bodies by the method of synthesis and substitution, which are daily multiplying. Closely connected with the same subject are the investigations into the constitution of the more complex organic acids, which have been prosecuted so actively during the last five or six years, and which, in the hands of Kolbe, Frankland, Perkin and Duppa, Kekulé, Wurtz, and their pupils, have made such rapid progress. During the past year Frankland and Duppa have especially signalized themselves by their researches upon the lactic and the acrylic series. Two years ago, Frankland, commencing with oxalic ether, and acting upon it with zinc ethyl, obtained from it leucic ether by substituting ethyl for a portion of the oxygen contained in the oxalic ether; and afterwards, conjointly with his friend Duppa, he has generalized this reaction. Still more recently, these chemists have traced the connection between the lactic and the acrylic or oleic series, by reactions in which the abstraction of the elements of an atom of water from the basylous portion of a member of the lactic group converts it into the corresponding member of the acrylic series. In these and kindred investigations, the necessity for the introduction of fixed principles of nomenclature for regulating the construction of names for the recently-discovered compounds has been sensibly felt; and indeed the changes in notation rendered necessary by the alteration in the values assigned to the atomic weights of many of the chemical elements have rendered a general revision of the system of chemical nomenclature a matter of pressing importance. Probably few subjects could more usefully occupy a portion of the time of this Section during the ensuing week than a thoughtful consideration of the changes which it may be expedient to introduce. The meeting of chemists from various parts of Europe with many from distant parts of our own country affords an excellent opportunity for discussing a subject of this kind, where any conclusions, to be practically effective, must secure the concurrence of a majority of the active cultivators of the science. Passing allusion only can now be made to some of the processes of mineral and metallurgic chemistry, such as the improvements in the details of the process for preparing magnesium, the comparative facility with which the recently-discovered metals thallium, rubidium, and cæsium, and their compounds may be obtained, and the application by Redtenbacher of his observation of the sparing solubility of their alums to the extraction of the new alkalies from the lithium residues of commerce. Of indium, too, the latest of the newly-discovered metals revealed by the spectrum, it must suffice to say that it has been obtained in quantity which places its existence as a distinct metal beyond question. I am indebted to my friend Prof. Roscoe for the small specimens of the metal and its sulphide now upon the table. An extensive branch of industry is now springing up in the improved methods of voltaic deposition of the metals. Weil has, by the use of an alkaline solution of tartrate of copper, contrived to coat iron and steel with a tough, closely adherent sheathing of copper, by simply suspending the articles to be coated by means of a wire of zinc in the metallic bath. No battery is required. Lead and tin may in a similar manner be deposited on copper, iron, or steel, if the oxide of tin or of lead be dissolved in a bath of strong solution of caustic soda. I must, before I conclude, advert to one or two interesting additions to our knowledge upon the side where chemistry and physics meet. Few results, perhaps, were more unexpected than those obtained by Deville and Troost upon the permeability to gases of certain dense metals at elevated temperatures. They have proved that platinum and iron, when white-hot, become for the time porous, and are rapidly permeated by hydrogen, which will even pass out under the pressure of the atmosphere and leave a vacuum almost perfect within the tube. In one form of these experiments, tubes of hammered and of cast platinum (which in one case was as much as a twelfth of an inch in thickness) were fitted by means of corks into the axis of a shorter and wider tube of glazed porcelain; a slow current of pure and dry hydrogen was then maintained through the porcelain tube, whilst a current of dry air was transmitted through the platinum tube. At ordinary temperatures no change was observed in either gas. A fire was then lighted around the outside of the porcelain tube, and gradually raised until the heat became very intense. At 2000° Fahr. the oxygen contained in the air had entirely disappeared; nothing but nitrogen mixed with steam passed out of the platinum tube, hydrogen had passed through the pores of the platinum and entered into combination with the oxygen of the air within; whilst at still higher temperatures the moist nitrogen became mixed with hydrogen. As the tube cooled, the same phenomena occurred in the inverse order, till, when the ordinary temperature had been regained, no diffusion of hydrogen was perceptible, and unaltered air was collected from the platinum tube. Analogous results were obtained when a tube of soft cast steel was substituted for that of platinum, though the thickness of the steel tube was an eighth, or in some cases as much as a sixth of an inch. From these experiments one practical conclusion deducible is, that air-pyrometers, the bulbs of which are formed of iron or platinum, cannot be relied on when employed for measuring elevated temperatures; glazed porcelain, however, was found to confine the gases completely. Curious as these results are, they are but parenthetical in another series of more general bearing, in which Deville has for some time been engaged, viz. the phenomena of *dissociation*, as he has termed the partial decomposition which compound gases experience under the influence of a temperature more or less elevated. A very striking result was obtained by the use of an apparatus similar to that employed in the experiments just described, but in which a brass or silvered tube was substituted for the platinum or iron tube. A rapid flow of water was maintained through the metallic tube, so that it was kept quite cool, whilst the outer porcelain tube was gradually raised to an intense heat as before. On transmitting a current of pure and dry carbonic oxide through the porcelain tube, the lower part of the surface of the cold metallic tube became covered with deposited carbon, whilst a portion of the carbonic oxide, by combining with the oxygen previously united with this carbon, became converted into carbonic anhydride. Sulphurous anhydride was by similar treatment resolved into sulphur and sulphuric anhydride; and even hydrochloric acid was partially separated into hydrogen and chlorine. These experiments are intimately connected with the attempts made to explain the cause of certain exceptions to Ampère's law, that *equal volumes of gases or vapours contain the same number of molecules of each.* Chemists now generally assume that the molecule, both of simple and of compound bodies, forms two volumes of vapour, and consequently that the molecular weight of any substance corresponds with the number which represents twice its density, when referred to the density of hydrogen, if this be taken as unity. But there are exceptions to this law: pentachloride of phosphorus, hydrochlorate of ammonia, hydriodate of phosphuretted hydrogen, and various other bodies, instead of forming two volumes when one molecule of each is converted into vapour, yield four volumes. In order to explain these anomalies, Kopp and Cannizzaro suppose that, at the temperature at which the vapour-densities of these compounds are observed, the bodies are temporarily decomposed, and, instead of forming one homogeneous vapour, are at the time of the observation really composed of a mixture of vapours. In certain cases this explanation is probably the true one; but its general acceptance has been disputed by Deville himself, though his results on dissociation seem, to cursory observation, to be in its favour; and it must be admitted that, up to the present time, the arguments and experiments which he has brought forward in opposition to the views of Kopp and Cannizzaro have not been satisfactorily answered. No sufficient proof, for example, has yet been adduced that the well-known anomalous cases of nitric oxide, chlorous anhydride, hydrosulphide of ammonium, cyanide of ammonium, and various other salts of ammonium and the volatile bases, are due to dissociation of their components. This subject is one, however, too intimately connected with the molecular theories at present under discussion to remain long in its actual state. New experiments and evidence will, no doubt, be forthcoming, which will throw further light upon the cause of these outstanding exceptions."

ON THE COMBUSTION OF IRON IN COMPRESSED OXYGEN.

BY E. FRANKLAND, F.R.S.

Whilst oxygen was being compressed into a Natterer's apparatus, recently supplied to the Royal Institution from Vienna, an accident occurred, which deserves to be placed on record, owing to the interesting relations of iron to highly compressed oxygen revealed by it. The accident occurred in the following manner:—Oxygen was liberated from pure chlorate of potash, heated in a Florence flask, and was collected in a floating bell-gasholder, whence it was drawn through a flexible tube, and pumped in a strong wrought-iron receiver, of ·62 litre capacity, and weighing 2·775 kilogrammes. When about 25 atmospheres of oxygen had thus been introduced into the receiver, a sharp explosion occurred, followed by a shower of brilliant sparks, which lasted for several seconds. On examining the apparatus, it was found that the union-joint connecting the pump with the receiver had given way, allowing the compressed gas to escape from the latter. The pump-head, containing the valve, was slightly scorched internally. The steel tube connecting this head with the receiver was very hot, and had obviously been in a state of active combustion, as it was coated internally with a layer of fused oxide of iron, whilst its bore had increased to at least three times its original size, and in two places the tube was even perforated. The receiver was also heated, although not to such an extent as to be unbearable to the hand. On examining its interior, it was found that the combustion had been propagated to the steel cap, the narrow passage in which was hollowed out into a capacious chamber, whilst the steel screw-valve had been completely consumed. The combustion had not, however, stopped here, but, extending into the receiver itself, had seized upon the internal walls of the latter, and covered them with fused globules of magnetic oxide of iron, and there can scarcely be a doubt, that, had the union-joint not given way, and thus furnished an outlet for the compressed oxygen, the latter would, in a few seconds more, have converted the receiver into a most formidable shell, the almost inevitable explosion of which would have scattered fragments of intensely ignited iron in all directions.

Regarding the primary cause of this explosion, there can scarcely be two opinions. The piston and valves were lubricated with olive oil, and the latter, becoming ignited by the heat of the compressed gas, had communicated its combustion to the steel and iron of the apparatus. Although the pump and receiver were not artificially cooled, yet this circumstance did not in all probabillty contribute materially to the ignition, because the oxygen was very slowly pumped into the receiver, the operation having to be frequently interrupted, to wait for the necessary quantity of gas which was being contemporaneously generated. Moreover, I had ascertained, immediately before the explosion, that the receiver was quite cold, and the head of the pump only just perceptibly warm. A few days previously, 60 atmospheres of oxygen had been with impunity *rapidly* pumped into the same receiver, and equally without any external refrigeration. How, then, is this difference of result to be accounted for? The answer to this question is not difficult when an apparently trivial alteration of the condition of the apparatus, in the two operations, is known. In the directions for the use of Natterer's apparatus, contained in the article "Kohlensäure" ('Handwörterbuch der Chemie,' Band iv.), the writer states, that before pumping commences, the space between the piston and the valve should be filled up with oil, so as to prevent the retention of any gas between the piston and valve, when the former, in compressing, is pushed to the extreme limit of its stroke. Any gas so remaining in such space (*schädlicher Raum*), expands again on the return of the piston, and thus causes, if not an actual loss of power, at least a considerable retardation in the compressing process. In the operation above described, in which 60 atmospheres were compressed with impunity into the receiver, I omitted to follow this part of the directions of the 'Handwörterbuch,' whilst in the subsequent experiment in which ignition occurred, a layer of olive oil, about 0·1 inch thick, was poured upon the piston, so as exactly to fill the space above mentioned.

Now, a careful examination of the burnt parts of the apparatus, leaves no doubt that the combustion commenced in the space between the piston and valve, and that it was this layer of oil which first became ignited. The compression of oxygen to $\frac{1}{25}$th of its volume should, according to thermo-mechanical laws, raise the temperature of the oxygen to upwards of 2000° C., but after making due allowance for the loss of heat to surrounding surfaces, there still remains a temperature sufficiently high for the ignition of oil under favourable circumstances. If the oil be spread as a thin film upon the surface of a mass of metal, the rapid absorption of heat by the latter prevents the temperature of the oil from rising to its igniting-point; but, in the form of a layer 0·1 inch in thickness, no such rapid refrigeration can occur, and the surface of the oil, in contact with the gas, may become ignited by the rapid communication to it of the high temperature of the compressed oxygen. It is also not improbable, that traces of chlorate of potash, which are always carried over with oxygen when the latter is rapidly evolved, may have found their way into the pump, and contributed, to some extent, to the ready inflammability of the oil. However this may be, the result ought to be regarded as a caution against the use of combustible lubricants in the compression of oxygen or nitrous oxide. If ignition of the oil occur at high pressures, it will assuredly be communicated to the iron of the receiver, which evidently burns in oxygen compressed 25 times, with at least the same facility as tissue-paper in atmospheric air, the condition of the various parts of the apparatus, after the explosion, leading to the conclusion, that the combustion from the beginning to end occupied only a very short time, probably not more than three or four seconds. The risk attending the compression of oxygen and nitrous oxide, may be avoided by the employment of a non-combustible lubricant. For this purpose, a strong solution of soft-soap in distilled water, appears to answer very well.

The facility with which a mass of iron thus becomes ignited, and the rapidity with which it burns in oxygen, at high pressures, suggests the possibility of employing shells of wrought or cast iron charged with compressed oxygen, for warlike purposes. The interior of such a shell would scarcely be more difficult to ignite than gunpowder, and, once ignited, the pressure of the enclosed oxygen would, notwithstanding its absorption, be for some time augmented by the intense heat, whilst the walls of the shell would become thinner, until they finally burst into fragments of burning and semi-molten iron. The condition necessary to secure such a result, may be determined from the known absolute thermal effect of iron in oxygen. Andrews found that the union of one litre of oxygen with iron, produces sufficient heat to raise the temperature of 5940 grammes of water through 1° C. It hence follows, that 780 cubic inches of oxygen, by combination with iron, would evolve sufficient heat to raise 1 lb. of cast-iron to its melting-point. This amount of oxygen introduced into the receiver above described, would exert a pressure of 20·5 atmospheres, consequently in would require the union of a quantity of oxygen exerting a pressure of 125 atmospheres, to raise the whole of the receiver to the melting-point of cast-iron. These conditions are not encouraging; for, although al ess amount of oxygen than that required for the complete fusion of the shell would suffice for the purpose required, yet, it would doubtless be necessary to augment the thickness of such a vessel when used as a projectile, and this would necessitate a corresponding increase in the bursting charge of oxygen. Thus, little could probably be effected with less than 100 atmospheres of oxygen forced into the shell,—a pressure, which, I fear, would prove not only dangerous, but unmanageable.—*Journal of the Chemical Society.*

SCIENTIFIC EDUCATION.

Physics lies at the foundation of all science; and if nothing else were taught, it would be a great gain to have the youth of this country soundly instructed in the laws of the elementary forces—gravitation, heat, light, and so forth. The purely physical sciences furthermore have the great practical advantage that they can be pursued to a great extent without what have been felicitously termed "stinks or messes," while the state of knowledge regarding them is such, that these elements can be taught as thoroughly as those of grammar or those of mathematics. The practical difficulties in the way of teaching boys chemistry thoroughly and as a discipline, appear to me to be much greater. Still greater obstacles beset the teaching of most of the biological sciences thoroughly and as disciplines. For the latter purposes and for boys, zoology and animal physiology are out of the question; though I do not see why the rudiments of both, or at any rate of human physiology, should not be made a part of instruction. Human physiology could be made quite as intelligible as either history or geography, and might be much more readily brought practically home to a boy's mind. But botany, with its readily accessible subjects, easy and not disagreeable anatomy, and clear and definite terminology, might be made the means of giving a thorough training in the elementary biological science. By the well-guided study of a score of common plants a boy would not indeed be made a botanist (nor is it necessary or desirable he should be one), but he would learn the use of his eyes and of his fingers, the employment of terminology, the meaning of classification, the general laws of vitality, and the scope and signification of the leading ideas of biology. He would be put on the same level with respect to biological science as a boy who had been well grounded in Latin grammar, Cæsar, and Virgil, would occupy with respect to the classics. On the whole, I am strongly in favour of confining instruction in science for disciplinal purposes to elementary physics (with incidental chemistry) and botany, with the addition of the outlines of human physiology. A boy well grounded in the rudiments of these sciences would find none of the methods and very few of the conceptions of the others absolutely strange. If it should be found practicable, in addition, to teach the outlines of geology as information, so much the better; but I am sure that the great aim should be to teach only so much science as can be taught thoroughly; and to ground in principles and methods rather than attempt to cover a large surface of details. I believe that the most perfect method of teaching science is that pursued by chemists and anatomists, who combine lectures with practical demonstrations, and thus unite all that is excellent in both the professorial and the tutorial systems. But it should be understood that scientific teaching will be a mere sham and delusion, and had better not be attempted at all, unless a fair share of time and attention be given to it, and unless the rewards attainable by proficiency are fully equal to those within the reach of the boys who devote themselves more especially to other lines of work. If no scholarships at the Universities are open to boys, and if no fellowships at the colleges are attainable by men, who show a special aptitude for science, the introduction of scientific teaching into public schools will be a mere farce.—*Professor Huxley, in Evidence before Select Committee of the House of Lords.*

POISONING BY STRYCHNINE.

On Thursday, September 21st, at Salisbury, the adjourned inquest on the body of Miss Emily Sophia Blake was resumed before Mr. R. M. Wilson at the Council-house.

The deceased was daughter of Mr. T. J. Blake, surgeon, of Castle Street, Salisbury, and was 19 years of age. It appeared from evidence taken previously that on the night of Tuesday, the 5th inst., Mr. and Mrs. Blake were alarmed by hearing cries from the bedroom of the deceased. They proceeded to the spot, and found her in great agony and screaming loudly. Her body was rigid, and she exhibited all the symptoms of having been poisoned by strychnine. They sent for Dr. Roberts and Mr. W. M. Coates, who shortly afterwards arrived. She admitted to Dr. Roberts, when told she was dying, that she had taken three pills which had been given her by Mr. William John Storer, who had been her father's assistant some time before. Dr. Roberts asked her if any of the pills were left, and she said there was a box of them in the dressing-table drawer, where the box was found. She then fell into convulsions, and died.

Mr. Whatman appeared to watch the case on behalf of the friends of the deceased; Mr. Lee attended on behalf of the city magistrates; and Mr. Kelsey represented Mr. Storer, at present under remand by the magistrates, charged with the murder of the deceased.

Application was made for Mr. Storer to attend, who wished to be present, but this was refused by the coroner.

Mr. Superintendent Caldow gave evidence as to the arrest of Mr. Storer at Topsham, who then, in answer to the superintendent, denied having given or sent any medicine to Miss Blake. At the house where Mr. Storer had been staying two boxes were found, containing a large quantity of letters, and a small medicine chest, some of the drugs from which were taken to Professor Taylor. The pink paper produced contained six grains, and Professor Taylor had taken five grains out of it. It had on it the part of a label, on which the letters "tryc" only remained. The letters were then read, the following extracts from which tend to show the intimacy existing between the two parties.

"Thanks, darling, for the powders. I have taken two, but no good yet. Mamma wrote to aunt, and said it is my time. I am to take care of myself. Do you think you had better send me something stronger? I mean pills, or some more powders. I am always down in the morning to take letters out of the box, so you need not fear sending the pills so long as I have them in the morning. I hope I shall be all right before I come home, for mamma will be sure to ask me on Friday. Write to-morrow. Good-bye, pet."

"My darling, mamma says that papa is in a way about me, and is going to examine me. Do you think he will find it all out? Mind, I shall still say you have taken no liberties with me. Say yes or no to 'Fernanda,' meaning whether he will find it out or not. Burn this."

Mrs. Blake, on being recalled, stated that she had no reason to suspect any improper intercourse between her step-daughter and Mr. Storer, nor had she used any threat as to an examination.

Dr. Alfred Swaine Taylor said, that on the 7th of September he received a jar containing, as was alleged, portions of the viscera of the deceased, a small bottle, and a box of pills. On September 12th, in compliance with an order from Sir George Grey, he proceeded to examine these articles. The pills in the box were twelve in number. The average weight of each was rather more than four grains. They were of a brown colour, and had an aromatic smell. They were soft, as if made with treacle or syrup. Under the microscope they presented no unusual appearance. No crystalline or mineral matter could be perceived in them. They contained neither arsenic, antimony, nor mercury, but they contained a large proportion of sugar, with vegetable matter similar to the aromatic confection of the Pharmacopœia. Three of the pills weighing 12·6 grains were submitted to the usual processes for the detection of strychnia and other alkaloids of the like nature. Strychnia was separated from them in a crystalline state, and distinctly identified by all of its principal chemical properties. The decoction of the pills in water and spirit had the intensely bitter taste of strychnia. This taste remained upon the tongue for more than an hour. From the three pills a quantity of strychnia equivalent to half a grain was separated. Assuming that the strychnine was equally distributed among them, this would make a proportion of one-sixth part of a grain for each pill. By another chemical process the strychnine contained in the half of another pill was extracted. This was found to be equivalent to one-tenth part of a grain, or representing one-fifth part of a grain for each pill. By another chemical process the strychnine contained in the half of another pill was extracted. This was found to be equivalent to one-tenth part of a grain, or representing one-fifth part of a grain for each pill. (The packet of strychnia was produced.) Considering that it is exceedingly difficult to extract the whole of the strychnia contained in a pill under such circumstances, it may be inferred that each pill would not contain less than from one-sixth to one-fifth of a grain, and that three pills would therefore contain from three-fifths to one-half of a grain. Three other pills taken from the box were made into an extract with spirit (for dissolving strychnia), and one-half of this extract was placed within a wound made in the skin of a rabbit. In four minutes the animal was seized with the usual tetanic convulsions which are produced by strychnia. These followed each other in rapid succession, and the animal died in three minutes, making altogether seven minutes from the time at which the extract, equivalent to one pill and a half, was placed beneath the skin of the rabbit. The blood contained in the bottle was then examined, but chemical analysis did not show in it the presence of strychnia.

The contents of the jar were submitted to the same chemical processes as the pill for the detection of strychnia; the result was that traces of that substance were detected in the liquid portion of the contents, but the liver and spleen did not contain any trace of that poison. The conclusions which I draw from this analysis are—Firstly, that the pills contained strychnia in a quantity sufficient to cause death, according to the number taken; secondly, that there were traces of strychnia in the contents of the stomach; thirdly, that there was no strychnia in the liver, spleen, and blood. This is a correct statement of the result of the analyses of the stomach, a box of pills, some blood, and portions of the liver and spleen, handed to me by Mr. Collins, the clerk to the coroner, on the 7th of September. Assuming that three pills had been taken shortly before the death of the deceased, and that they contained a similar amount of strychnia to that which I examined, I should not have expected to find greater and more distinct traces of strychnia in the stomach of the deceased than I did. The dose was very small. I should state that the longer a person lives after taking poison, the less trace of it is found, as it becomes absorbed into the system. I should not have expected to find it in the blood. Had it all been there, the proportion would only have been the fiftieth part of a grain to one pound of blood. Assuming the quantity of strychnia to have been taken which I discovered in the three pills, I should not have expected to find any traces in the liver or spleen. Half a grain of strychnia would destroy the life of an adult. Strychnia is given in cases of paralysis and nervous affections; but the medicinal dose would commence at the twentieth part of a grain, and increase to a twelfth, or even a tenth part of a grain. I may observe that symptoms of poisoning begin in doses from a quarter to a third of a grain, and actual death has taken place in two known instances from a quantity equivalent to that which is before you. The quantity of strychnia I found on the deceased is consistent with either a poisonous or a medicinal dose. From the traces found in the stomach I can draw no inference; the residue was consistent with either, as I have said, so that I can form no conclusion as to the cause of death. I cannot conceive that strychnia would be a proper medicine for the purpose of procuring abortion. I have never heard of it. I can conceive no other effect than convulsions resulting in death. The action of strychnia is over the voluntary muscles, and I have not heard of its action on the uterus. I do not think one pill would destroy life; two might have jeopardized it; but three would, I think, have been fatal to any one. It is possible that one pill may contain more than another; but from the analysis I made I take it that the strychnia in them was pretty equally divided, and that any adult taking three of those pills would die. There were not any directions on the box, as there should be in case of administration of such a poison. It is not usual to administer strychnia in pills, but in solution, as the dose can be thus more accurately apportioned. I have never personally known strychnia used as a medicine in procuring more regular feminine irregularities, but it has been stated on competent authority to have been so used and with benefit. Dr. Bardsley, of Manchester, is one of the authorities. There was cinnamon, cloves, sugar, and other aromatic confections in the pills; but though I tested for arsenic, antimony, and other powerful poisons, I found nothing but strychnia. I should say that no medical man would venture to give the dose of strychnia contained in one pill—that would be one-sixth of a grain. It would be a large dose for a person even in the habit of taking strychnia. I should say that three of those pills would act in from half an hour to three-quarters of an hour, but I should think that poison is always more slow in action on a full stomach. The pills were apparently made up by a person conversant with medicine. The saccharine matter of which the pills were partially made would be influenced by the weather—dry in dry weather, damp and sticky in wet or muggy weather. Battle's vermin-killer contains strychnia to the extent of a grain and a half in the sixpenny packet, and three-quarters of a grain in the threepenny packet. Strychnia has been given as a tonic for indigestion or disorders of the stomach, but in very small doses in all cases. Had the deceased taken one pill she might not have died, but in a case recently under my knowledge the same quantity produced in an adult man convulsions and all the symptoms of poisoning to an alarming extent. Assuming that I had not heard anything of the pills or the symptoms before death, I did not find sufficient strychnia to cause death. On the 19th of September I received a packet from Superintendent Caldow, a white crystallized substance, weighing 11 grains. It is strychnia.

The Coroner directed the jury in his summing up that if the pills containing strychnia were given by an unqualified man through ignorance, and death resulted, they (the jury) should return a verdict of manslaughter; but if that medicine was administered with "malice," then it would be in the eye of the law murder.

The jury retired at half-past five, and, after an absence of half an hour, returned the following verdict:—"We find that the deceased Emily Sophia Blake died from the effects of strychnia taken by her in three pills, given to her by William John Storer and we find a verdict of manslaughter against the said William John Storer."

MISCELLANEA.

Case of Accidental Poisoning by Arsenic in Glasgow.—We learn from the 'Glasgow Morning Journal' that the police authorities of the southern district of Glasgow have been inquiring into the particulars of a case of poisoning by arsenic. The following are the circumstances elicited:—Sergeant Inglis reported at the Southern Police Station that a woman, forty-eight years of age, named Bridget Cummisky or Keechan, and daughter, Mary Keechan, a child of five years of age, had taken seriously ill within their house at 144, Main Street, Gorbals, and that Dr. Docherty, who was attending them, was of opinion that they were suffering from the effects of poison. It seems that about nine o'clock on Saturday night, her child being slightly unwell, Mrs. Keechan went to the shop of William Arbuckle, herbalist, 153, Main Street, Gorbals, and asked for a half-penny worth of cream of tartar, and a halfpenny-worth of magnesia, and received from him two small powders in separate parcels. When she went home, she mixed the powders in a coffee-cup full of buttermilk, and gave her daughter one or two mouthfuls of the mixture, more than which the child refused to take, because the taste of the stuff was nasty. Rather, however, than lose the milk, Mrs. Keechan drank the remainder of the contents of the cup herself to the very dregs. About ten or fifteen minutes afterwards, the child was seized with pains in the stomach, and vomited two or three times. Shortly afterwards the mother also was seized with violent spasms, and what she termed cramp in the legs, followed by vomiting, which continued for many hours, during which time she was very prostrate. At two o'clock Dr. Docherty was called in, and from the symptoms exhibited came to form the opinion mentioned above. He administered an emetic, and used the stomach-pump; but, notwithstanding all the efforts used, the patients remained then, and remain still, in a precarious condition. The little girl was in a bad state, but Mrs. Keechan was much worse. Nothing would lie on her stomach; she was very weak, and continued to vomit a greenish matter streaked with blood, her features were pinched, her eyes sunken, her fingers clenched, and altogether she betokened great suffering, and was nearly pulseless. Dr. Docherty went to Mr. Arbuckle's shop, and asked for the same quantity of cream of tartar and magnesia as Mrs. Keechan had purchased. He received two powders made up in separate papers, and these were subsequently tested in presence of himself and Dr. Dunlop by Mr. Kinninmont, chemist and druggist, South Portland Street, who found that in the parcel represented as containing magnesia, there was really no magnesia, but a substance, acid and burning to the taste, and metallic in its appearance, which turned out to be white arsenic of a coarse description. It is alleged that the woman Keechan must have taken a quantity of the powder equal to about a quarter of an ounce of arsenic. The medical men and an officer of police went to Arbuckle's shop to take possession of the bottles from which he had served the powders purchased, and found them to contain two or three ounces more of arsenic. Mr. Arbuckle, we believe, says he has been selling the same stuff from the same bottles for four years, and that he must have, in the course of that time, sold about two pounds of it.

Accidental Poisoning by Aconite.—On Wednesday, August 23rd, Mr. Fullager, the coroner for East Sussex, held an adjourned inquest at the Town Hall, Hove, Brighton, on the body of Mr. Thomas Boys, formerly residing in Lansdown Place, in that parish. It appeared from the evidence that the deceased, who was eighty years of age, suffered from disease of the heart, and, by the advice of his medical man, had been in the habit of taking thirty drops of tincture of henbane, to allay the palpitation and to produce sleep. He also used tincture of aconite externally. On Friday, August 18, a fresh supply of these medicines was obtained from Mr. Noakes, chemist, North Street, and on the Sunday night following Mr. Boys took thirty drops from the bottle labelled "Tincture of Henbane, Poison," in a wineglass of camphor julep. He remarked that there was something peculiar in the taste, and half an hour afterwards he was seized with numbness and cramp, and had a desire to vomit. He died about five o'clock the following morning. On the contents of the bottle being analysed, it was found to be tincture of aconite instead of henbane. The *post-mortem* examination showed very extensive disease of the heart, and, from the medical evidence given, it appeared to be very doubtful whether death was caused by the aconite or resulted from natural causes; in fact, one of the medical witnesses was of opinion that deceased was in a dying state when he called for his medicine. . It having been proved that the bottle contained aconite, evidence was taken for the purpose of tracing the same from Mr. Noakes's shop to the house of the deceased. The coroner having addressed the jury at considerable length, the following verdict was returned:—"That the said Thomas Boys died from the effects of aconite, and that such aconite was supplied to him from the shop of Richard Noakes, of North Street, Brighton, Chemist, in mistake for henbane." Subsequently, Mr. Noakes was brought before the magistrates on the charge of manslaughter, and at the conclusion of the inquiry they regretted that they felt called upon to send the case to a jury. Bail was accepted, the accused in £200, and two sureties in £100 each.

Poisoning by Veratria.—On Thursday, September 21, Mr. C. J. Carttar, coroner for West Kent, resumed an inquiry, which had been three times adjourned, into the circumstances attending the death of Mrs. Elizabeth Reeve, aged 40, the wife of a veterinary surgeon residing at 52, Asburnham Grove, Greenwich, and which, it is alleged, was occasioned by the administration of a certain poison known as veratria.

Mr. H. R. Palmer, surgeon, said that on the 15th of August last, he was called by the husband of the deceased to see his wife, who was dangerously ill. He also said that his wife had been seized with vomiting, and had been attended the day previously by Mr. Hope's assistant, who had administered some effervescent medicine, after taking of which his wife had complained of the taste, and had become worse. Witness tasted the medicine, which he found to be an ordinary saline mixture. He found her fast sinking, and, having another case to attend, he left, and on returning home three or four hours afterwards he heard that death had taken place.

After some further medical evidence, Dr. Cogan, of Greenwich, said that, in the company of his two assistants, and other medical gentlemen, he made a *post-mortem* examination of the body, and found that deceased was about eight months with child. On the left side, between the membrane and the brain he found a clot of blood, arising from the rupture of a blood-vessel, sufficient to cause death, which might have been occasioned by excessive vomiting.

Professor J. E. R. Rodgers, of Pentonville, said he had received a box from Dr. Cogan, containing parts of the body of the deceased with two quantities of wine, and the remainder of the mixture and powders prescribed by Mr. Hope's assistant. He found the kidneys diseased as in "Bright's disease." Different parts were subjected to a distinct system of analysis, mercury and antimony being first searched for, but there was no trace whatever of any metallic poison. In the wine he found an alkaloid, being a separation from various plants, and which gave indications of the presence of a deadly poison known as veratria or white hellebore. In the kidneys, viscera, and portions of the liver he found the same traces in minute but clear quantities, and in the stomach the poison was in greater quantities. One-fourth of a grain of this poison would be dangerous to life, whether swallowed or taken into the system in any other manner. Half a grain would be very dangerous, and death would take place in from six to twenty-four hours. The poison was used externally for neuralgic pains. He had tested the medicines prescribed by Mr. Hope's assistant; they were perfectly pure. The poison had been absorbed into the blood of the deceased, but from the quantities traced, he had no doubt that enough might be detected to cause death.

Dr. Cogan said, after hearing the evidence of Professor Rodgers, his opinion was that the poison, in producing vomiting, had been the cause of the rupture of the blood-vessel, and that this had been the cause of death. The Coroner, after consultation with the jury, said it had been determined to adjourn the inquiry, and he felt it his duty to call upon the husband of the deceased to enter into recognizances of £100 to appear before him at the next examination.

REVIEWS.

FOR AND AGAINST TOBACCO; OR TOBACCO IN ITS RELATIONS TO THE HEALTH OF INDIVIDUALS AND COMMUNITIES. By Benjamin Ward Richardson, M.A., M.D., Senior Physician to the Royal Infirmary for Diseases of the Chest. London: John Churchill and Sons, 11, New Burlington Street, W. 1865.

The great increase in the number of tobacco-smokers which has taken place of late years, and the little real knowledge we possess of the effects of tobacco smoking on the human body, invest the subject treated of in this essay with a great and growing interest. Some recent writers have told us that tobacco smoking is the cause of numerous and fatal diseases; while Drs. Christison and Pereira state that they are unacquainted with any well ascertained ill-effects resulting from the habitual practice of smoking. With such conflicting opinions, a treatise on Tobacco in its Relation to Health is required, which shall be founded, more especially, on fresh researches, and in which the conclusions shall not be hastily arrived at, but based on long experience of the effects of tobacco on the human system, and from experiments performed generally on animals. With these views Dr. Richardson has investigated the subject, and although much further research is still required, we regard his essay as a valuable addition to our knowledge of the physiological effects, etc., of tobacco smoking; and we cannot do better (although the extract is rather a long one) than quote Dr. Richardson's summary, —For and Against Tobacco:—

"1. The effects that result from smoking are due to different agents imbibed by the smoker, viz. carbonic acid, ammonia, nicotine, a volatile empyreumatic substance, and a bitter extract. The more common effects are traceable to the carbonic acid and ammonia; the rarer and more severe to the nicotine, the empyreumatic substance, and the extract.

"2. The effects produced are very transitory, the poisons finding a ready exit from the body.

"3. All the evils of smoking are functional in character, and no confirmed smoker can ever be said, so long as he indulges in the habit, to be well; it does not follow, however, that he is becoming the subject of organic and fatal disease because he smokes.

"4. Smoking produces disturbances: (*a*) In the *blood*, causing undue fluidity, and change in the red corpuscles; (*b*) on the *stomach*, giving rise to debility, nausea, and in extreme cases sickness; (*c*) on the *heart*, producing debility of that organ, and irregular action; (*d*) on the *organs of sense*, causing in the extreme degree dilatation of the pupils of the eye, confusion of vision, bright lines, luminous or cobweb specks, and long retention of images on the retina; with other and analogous symptoms affecting the ear, viz. inability clearly to define sounds, and the annoyance of a sharp ringing sound like a whistle or a bell; (*e*) on the *brain*, suspending the waste of that organ, and oppressing it if it be duly nourished, but soothing it if it be exhausted; (*f*) on the *nervous filaments and sympathetic or organic nerves*, leading to deficient power in them, and to over-secretion in those surfaces—glands—over which the nerves exert a controlling force; (*g*) on the *mucous membrane* of the mouth, causing enlargement and soreness of the tonsils—smoker's sore-throat—redness, dryness, and occasional peeling off of the membrane, and either unnatural firmness and contraction, or sponginess of the gums; (*h*) on the *bronchial surface of the lungs* when that is already irritable, sustaining the irritation, and increasing the cough.

"5. The statements to the effect that tobacco smoke causes specific diseases, such as insanity, epilepsy, St. Vitus's dance, apoplexy, organic disease of the heart, cancer, consumption, and chronic bronchitis, have been made without any sufficient evidence or reference to facts; all such statements are devoid of truth, and can never accomplish the object which those who offer them have in view.

"6. As the human body is maintained alive and in full vigour by its capacity, within certain well-defined limits, to absorb and apply oxygen; as the process of oxidation is most active and most required in those periods of life when the structures of the body are attaining their full development; and, as tobacco smoke possesses the power of arresting such oxidation,—the habit of smoking is most deleterious to the young, causing in them impairment of growth, premature manhood, and physical degradation.

"If the views thus epitomized in relation to the influence of tobacco smoking on individuals are true, we are led without any difficulty to the consideration of the influence exerted by the habit on communities and on nations. That which smoking effects, either as a pleasure or a penalty on a man, it inflicts on any national representation of the same man; and, taking it all in all, stripping from the argument the puerilities and exaggerations of those who claim to be the professed antagonists of the practice, it is fair to say that, in the main, smoking is a luxury which any nation of natural habits would be better without. The luxury is not directly fatal to life, but its use conveys to the mind of the man who looks upon it calmly the unmistakable idea of physical degradation. I do not hesitate to say that if a community of youths of both sexes, whose progenitors were finely formed and powerful, were to be trained to the early practice of smoking, and if marriage were to be confined to the smokers, an apparently new and a physically inferior race of men and women would be bred up. Of course such an experiment is impossible as we live, for many of our fathers do not smoke, and scarcely any of our mothers; and thus, to the credit of our women, chiefly, be it said, the integrity of the race is fairly preserved: with increasing knowledge we may hope that the same integrity will be further sustained; but still, the fact of what tobacco can do in its extreme action is not the less to be forgotten, for many evils are maintained because their full and worst effects are hidden from the sight.

"Again, on the ground of the functional disturbances to which smoking gives rise in those who indulge in it, an argument may be used which goes very deeply, and cuts none the less sharply, because, in one sense, it is ridiculous. Put down the smokers of Great Britain at a million in number;—they are more than that, but let it pass:—Why should there exist perpetually a million of Englishmen, not one of whom can at any moment be writ down as in perfect health from day to day? Why should a million of men be living with stomachs that only partly digest, hearts that labour unnaturally, and blood that is not fully oxidized? In a purely philosophical point of view, the question admits of but one answer; viz. that the existence of such a million of imperfectly working living organisms is a national absurdity, a picture which, to a superior intelligence observing the whole truth and grasping it, would suggest a mania, foolish, ridiculous, and incomprehensible.

"I cannot say more against tobacco, however, without being led into a wider question; I mean the use of luxuries altogether; on which question, if I were equally fair for tobacco as against it, I should be forced to give it a place as one of the least hurtful of luxuries. It is on this ground, in fact, that tobacco holds so firm a position;—that of nearly every luxury it is the least injurious. It is innocuous as compared with alcohol; it does infinitely less harm than opium; it is in no sense worse than tea or sugar; and by the side of high living, altogether it contrasts most favourably. A thorough smoker may or may not be a hard drinker, but there is one thing he never is, a glutton; indeed, there is no cure for gluttony, and all its train of certain and fatal evils, like tobacco.

"The friends of tobacco will add to these remarks that their 'friendly weed' is sometimes not only the least hurtful of luxuries, but the most reasonable. They will tell of the quiet which it brings to the overworn body, and to the irritable and restless mind; their error is transparent and universal, but universal error is practical truth; for, in their acceptation, tobacco is a remedy for evils that lie deeper than its own, and as a remedy it will hold its place until those evils are removed. The poor savage, from whom we derived 'tabac,' found in the weed some solace to his yearning vacuous mind, and killed by it wearisome lingering time. The type of the savage, extant in modern civilized life, still vacuous and indolent, finds 'tabac' the time-killer; while the overworked man discovers in the same agent a quietus, which his exhaustion having once tasted rarely forgets, but asks for again and again. Thus, on two sides of human nature we see the source of the demand for tobacco, and until we can equalize labour, and remove the call for an artificial necessity of an artificial life, tobacco will hold its place, with this credit to itself, that, bad as it is, it prevents the introduction of agents that might be infinitely worse."

With these conclusions of Dr. Richardson's we believe that, in the main, all thoughtful men will concur. That the habit of smoking is most deleterious to the young; that excessive smoking is prejudicial even to the healthy and full-grown man; and that smoking, generally, is a luxury which any nation, of natural habits, would be better without, —are conclusions at which we have long arrived; but the question arises, Are there not thousands of men in this country and elsewhere, who are overworked in mind or body, or both, who are not living in a natural condition, but who are compelled to overstrain their mental faculties and bodily powers, and to whom some such a substance as tobacco is almost a necessity? We believe most persons will agree with us that there are, and that of all substances adapted for such a purpose tobacco is by far the best. We have no sympathy with the smoking youth, or with the man who smokes to kill time, or the one who persists in indulging the habit at all times and in all places; but to the man with overworked brain or over-fatigued body, we not only sympathize, but we believe that the moderate indulgence of the habit of tobacco-smoking is to be encouraged as one calculated to be, in the main, far more beneficial than injurious.

THOMSON'S CONSPECTUS OF THE BRITISH PHARMACOPŒIA. Edited by Edmond Lloyd Birkett, M.D. Cantab., Fellow of the Royal College of Physicians; Physician to the City of London Hospital for Diseases of the Chest. New Edition. London: Longman, Green, and Co. 1865.

This is a new edition of the late Dr. Thomson's well-known and highly-appreciated 'Conspectus,' prepared with the object of adapting that work to the British Pharmacopœia. We quite agree with the editor, that although "one principal object of Dr. Thomson in issuing the 'Conspectus,' to reconcile the differences of the three Pharmacopœias," had been fulfilled by the publication of the British Pharmacopœia, "as the plan of the work also contemplates Materia Medica and Therapeutics, it is manifest that there is still a place unfilled, and that it is as necessary as ever to hold *in conspectu* the prominent points of Pharmacy, Materia Medica, and Therapeutics."

Such a work should be concise, clear, and correct, and concise it certainly is, but it is neither clear nor correct. A casual inspection has been sufficient for us to detect numerous errors. Thus, we find the following in the notice of Yellow Bark:—"CHINCHONA FLAVA, *Calasaya of the Spaniards: the real plant is unknown;*" and Pale Bark is thus described:—"CINCHONA PALLIDA, Condaminea, Cinchona Coronæ Cinerea; (*The bark of many species of Cinchona.*)" Under Oleum Anisi no mention is made of *Illicium anisatum*, which is one of the officinal sources, and indeed that from which it is now almost entirely obtained: Catechu is said to be "*an extract of the wood of the Catechu: kernels of Areca Catechu; leaves of Uncaria Gambir:*" Kino is alluded to as the "concrete piece of the *Pterocarpus Marsupium*, of *Erinaceus*, and of other undetermined genera and species:" under Mezereum, no mention is made of *Daphne Laureola*, one of the officinal plants mentioned as a source: under Papaver, the dried ripe seed-vessels are ordered to be used: under Valeriana, the dried wild root only is mentioned. Styrax is said to be derived from *Liquidambar orientale*, Natural Order *Styraceæ; Strychnos Nux-vomica* is said to belong to *Apocynaceæ*, etc. etc. These are only a few illustrations of the errors, etc., we have found in this little volume, but these will be sufficient to show that it cannot be relied upon as an epitome of the present state of Materia Medica.

BENEVOLENT FUND.

As the election of two annuitants will take place on Friday, the 27th October, the following abstract from the rules in reference to votes may be useful:—

Rule 19. Annual Subscribers to the Fund of half-a-guinea are entitled to one vote at each election of cases; of one guinea, to two votes; and to increase in the same proportion.

Rule 20. Persons giving donations of five guineas are entitled to one vote for life; ten guineas, two votes for life; and to increase in the same proportion.

Rule 21. Firms or corporations giving donations of five guineas are entitled to one vote for ten years; ten guineas, two votes for ten years; and to increase in the same proportion.

Rule 22. One executor paying a legacy of £50 is entitled to five votes for life; a legacy of £100 entitles every one of the executors to five votes for life; and to increase in the same proportion.

Rule 25. Every member of the Society is entitled to two votes; every Associate of the Society is entitled to one vote.

Persons subscribing on or before the day of election will be entitled to vote thereat.

BOOKS RECEIVED.

A Dictionary of Practical Medicine. Comprising Special Pathology, the Principles of Therapeutics, the Nature and Treatment of Diseases, Morbid Structures, and the Disorders especially incidental to Climates, to Races, to Sex, and to the Epochs of Life: with an Appendix of approved Formulæ. The whole forming a digest of Pathology and Therapeutics. By James Copland, M.D., F.R.S., etc. etc. Abridged by the Author, assisted by James C. Copland, M.R.C.S., etc. London: Longmans, Green, and Co. Pp. 1537. 1865.

Report on the Physiological Action of Nitrite of Amyl. By Benjamin W. Richardson, M.A., M.D., etc.

An Inquiry into the Possibility of Restoring the Life of Warm-blooded Animals, in certain cases where the Respiration, the Circulation, and the ordinary manifestations of Organic Motion are exhausted or have ceased. By Benjamin Ward Richardson, M.A., M.D., etc. (From the Author.)

TO CORRESPONDENTS.

W. B. A.—The Pharmaceutical Journal is not the proper medium for personal disputes.

Student (Oxford).—The work will be published early in October.

Tyro (Birmingham).—Fownes's 'Manual of Chemistry,' Bentley's 'Manual of Botany.'

Student (Torquay).—The British Pharmacopœia is now alone used at the examinations of the Pharmaceutical Society.

Inquirer (Dover).—The price is 5*s*. It may be obtained through any bookseller.

Multum in Parvo (Northampton).—We presume a bookseller would be best able to answer the questions submitted, or perhaps the publishers of this Journal, Messrs. Churchill and Sons.

Ιατρος (London).—The author is thanked for his communication.

A. N. P. (Bury St. Edmunds).—(1) The deposit from cod-liver oil consists of the stearine of the oil. (2) The deposit in essential oils is generally the result of oxidation caused by exposure to air and light. (3) The green oil used in veterinary medicine is made by boiling elder-leaves in olive oil. (4) We are unable to give the derivation of the term "Opodeldoc;" it formerly signified a plaster for all external injuries. (5) The blackening caused by nitrate of silver is considered to be due to decomposition of organic matter, and reduction of the salt of silver. (6) Sulphate of zinc causes the separation of essential oils from solution in water; hence the phenomenon referred to in the question.

J. C. T. (Horton).—(1) The question is not worded so as to admit of its being answered. (2) There is no authorized formula. (3) See Vol. I. p. 451. (4) See Vol. VIII. p. 202. (5) Not for merely experimental purposes. (6) We know of none.

Inquirer (Evesham).—The sale of cocoa or chocolate is liable to the duty.

A Correspondent (Preston) wishes to caution chemists against selling methylated spirit without a licence.

J. M. (Crediton).—Glycerine and lime-juice—Vol. VI., Second Series, p. 668.

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, Bloomsbury Square.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VII.—No. V.—NOVEMBER 1st, 1865.

EXCISE INTERFERENCE WITH THE SALE OF QUININE WINE.

We have received several communications from different parts of the country, relating to the interference of the Excise with the sale of quinine wine. Paragraphs have recently appeared in some of the newspapers and journals on this subject, and many of our readers are no doubt aware that the Excise officers have again objected to the sale of quinine wine by those who do not possess a wine license. This interference has probably arisen from the means adopted for promoting the sale of the article, which has been extensively advertised at railway stations, and otherwise, throughout the country. Many a traveller has no doubt asked himself the question, "What is Waters's quinine wine?" and finding it sold by dealers in British wines, as well as by chemists, it might naturally be doubted whether it were most a medicine, a condiment, or an article of diet. If the basis be wine, the sale of which involves the necessity for a license, and the specific name be only intended to imply that it possesses tonic properties, which, however, do not prevent its being used as an ordinary wine, it might be considered a fit subject for investigation by the vigilant guardians of the public revenue, when they find it sold by chemists who have no wine license. It would, no doubt, be said in justification by these latter, that it is a medicine, as its name clearly indicates; and if it can be shown that it contains the bitter alkaloid quinine in appreciable quantities, so as to preclude its use for other than medicinal purposes, it might be thought the question would soon and easily be settled. We believe that it can be and has been shown, that the quinine wine of Mr. Waters and other makers, is *bonâ fide* what the name indicates, a solution of quinine, in which wine is used as the menstruum,—that, in fact, it is a solution of sulphate of quinine in orange wine, the quinine being present in sufficient quantity to render it strongly bitter. This being so, it is clearly as much a medicine as others of the medicinal wines, respecting which no question has arisen. But then it is sold, and we believe principally sold, by dealers in British wines rather than by dealers in medicine. In fact, the question that has recently been raised has applied to Waters's quinine wine, which is almost exclusively sold by grocers and other dealers in British wines. Mr. Waters is a wholesale agent, who supplies British wines to the trade, and by whom, it appears, the manufacture of quinine wine, made by dissolving sulphate of quinine in orange wine, was undertaken in consequence of his having used some of his own orange wine as a menstruum to administer quinine to his wife. This was found to be so good and agreeable a mode of administering quinine that Mr. Waters thought he would give the public the benefit of it, and he accordingly added quinine wine to his list, comprising ginger wine, orange wine, etc. Mr. Waters says he never contemplated in the first instance that this quinine wine would be viewed or treated by the Excise differently from his other British wines, and as he supplied it almost entirely to dealers who held the wine license, no question at that time arose respecting its sale. It was sold to the public under a name that fairly represented what it was, and Mr. Waters is justly entitled to the credit of having made no secret of its composition. It contains one grain of sulphate of quinine dissolved in a wineglassful of orange wine.

A good form for the preparation of orange quinine wine was many years ago given by Dr. Collier in his 'Translation of the London Pharmacopœia,' and was published in this Journal (November, 1846, page 226 of vol. vi.), in which one grain of sulphate of quinine was directed to be dissolved in one ounce of good orange wine, with the aid of about half a grain of citric acid.

It was naturally to be expected that the advertising of Waters's quinine wine should attract the attention of chemists and druggists, and that the public, after being referred to a wine merchant for medicine, should make some inquiry about it of those from whom they were accustomed to purchase their medicines. Chemists, therefore, taking advantage of the publicity given to the preparation by the advertisements, made their own quinine wine, by Dr. Collier's process or some other, and thus became competitors with Mr. Waters. But if the sale of Waters's quinine wine required a license, that of a similar preparation made by a chemist should do so also. The Excise officers had been accustomed to see quinine wine classed with ginger wine and orange wine, and sold by those who had a wine license, and they naturally concluded that it ought not to be sold by a chemist without a similar license. About two years ago proceedings were instituted against some chemists for selling quinine wine without a wine license, and the President of the Pharmaceutical Society memorialized the Board of Inland Revenue on the subject, pointing out the fact that quinine wine was as much a medicine as other medicated wines, and that it ought not to be classed with British wines, the sale of which required a wine license. The answer of the Board to this communication was explicit and perfectly satisfactory. Both communications were published in this Journal (January, 1864), but as the letter from the Board exactly meets the question that has more recently arisen, as it has been acted upon by chemists since that date, and, as we believe, correctly represents the law of the case, we reproduce it here.

Inland Revenue Office, 3rd December, 1863.

Sir,—I am desired, by the Commissioners, to inform you, in reply to your letter of the 10th ultimo, respecting the sale of "Medicated Wines," that they are advised that whenever the articles are held out by label or advertisement as beneficial to persons suffering from any ailment affecting the human body, they can only legally be sold under a patent medicine license, and with a stamped label on each packet, and also, in strictness, under an Excise foreign or British wine license, according to the character of the wine.

The Board, however, have instructed me to add, that, except in cases where there may be reason to believe that a beverage is being sold under colour of a medicine, they will not interfere with the sale, without an excise licence, of medicated wines of the description adverted to, provided that such medicines do not fall under the category of Patent Medicines.

I am, Sir, your obedient servant,

G. W. Sandford, Esq. William Corbett, Secretary.

This letter appeared to set the question at rest, not only as regards the liability of chemists, but with reference to the sale of quinine and other medicated wines generally. It has been referred to as an authority for selling quinine wine without a wine license, and Mr. Waters himself has used it for this purpose when the question has been put to him by his customers.

We have heard of no cases in which the Excise have interfered with the sale of quinine wine, since the publication of Mr. Corbett's letter, until a few months ago, in July last, when Mr. Waters was informed that his quinine wine could not be sold without a wine license; and this led to the following correspondence:—

2, *Martin's Lane, Cannon Street, July* 25, 1865.

To the Honourable the Board of Inland Revenue.

Gentlemen,—My attention has been called by the Supervisor of Excise of this district to your decision respecting the sale of quinine wine. He informs me that your Honourable Board have decided that the sale of this article requires a British wine licence. As your decision in this matter materially affects my trade, and the sale of an article that is universally admitted to be a boon to humanity itself, I humbly pray to be allowed to state various reasons why your Honourable Board should withdraw your late decision.

That my wine is called "Waters's Quinine Wine," a label of which I enclose, and that, as the maker of it, I have for years paid a licence (being a dealer in British wines).

That on December 3, 1863, your secretary, Mr. William Corbett, wrote a letter (copy enclosed), in which it was stated your Board would not interfere with its sale. Upon the strength of that letter your petitioner has incurred considerable expense in informing his customers that no licence was required, and has in each case referred them to your letter.

That, since your petitioner has been a maker of quinine wine, many others have also made and advertised it; in fact, there are few druggists throughout the kingdom who do not make such an article, and probably in no single instance are they called upon to pay a licence.

If this wine is liable, why should not steel wine, antimonial wine, and various other medicated wines be so also?

Your petitioner respectfully begs to call your attention to the fact that, while spirit is liable to a duty, yet methylated spirit is not, the spirit being rendered unfit for consumption; the addition of quinine to British wine renders that totally unfit to be drunk as British wine. There is not one of the patent medicine houses or wholesale druggists in London who do not occasionally send to your petitioner for various small quantities to make up their assorted orders, and your petitioner respectfully submits that it would be neither policy nor justice to compel them to take out a British wine licence. It is true that there are comparatively few cases in which this wine is sold without a licence, as almost all grocers, confectioners, oilmen, etc. take out the British wine licence. Your petitioner, therefore, respectfully submits that your Honourable Board should adhere to their letter of December 3, 1863, and that the trade in an article of so much real good should be left unfettered, and its sale not interfered with by the Excise throughout the country; and that, had your letter not been penned, this question could not have arisen. Your petitioner would be most happy to be permitted to appear before your Honourable Board to give any further explanation you may require.

I am your obedient servant,

ROBT. WATERS.

Inland Revenue, Somerset House, 29th July, 1865.

Sir,—With reference to your application dated the 25th instant, the Board desire me to inform you that the letter of which you enclose a copy was an answer to one from the secretary of the United Society of Chemists and Druggists, the question before the Board at that time being, as put by the President of the Pharmaceutical Society, whether, when wine was used as a menstruum for medicinal substances, and as medicine and medicine only, so as to be entirely taken out of the category of beverages, the Board would exact the licence duty payable on the sale of wines.

On the other hand, it appears in the present case that the wine is notified and used as a tonic beverage, and that the vendors could no more be exempted with propriety from the wine licence (unless in cases where this wine is sold under stamp and licence as a patent medicine) than the vendors of bitter ale, which is likewise considered and advertised as a tonic, could be exempted from the beer licence.

I am, Sir, your obedient servant,
ADAM YOUNG.

R. Waters, Esq.

2, *Martin's Lane, Cannon Street, August 3rd*, 1865.

To the Honourable the Board of Inland Revenue.

Gentlemen,—In reply to your letter of July 29th, your petitioner begs further to be allowed to urge upon your Honourable Board the fact that your letter of December 3, 1863, distinctly gives the public to understand that you would not interfere with the sale of medicated wines, except in cases where there may be reason to believe that a beverage is being sold under colour of a medicine. This, your petitioner submits, especially applies to his preparation of quinine wine, which cannot be used at all as a beverage, as it is well known quinine, from its extreme bitterness, and the effect it has upon the system, prohibits its use entirely except as a medicated wine. This is not the case with bitter ale, that article being simply a malt liquor more strongly impregnated with hops than other kinds, and is to all intents and purposes a beverage, and that only.

Your petitioner would also submit that he would be a great sufferer by your present decision, and that, having permitted the letter authorizing its sale as a medicated wine to be published, it would now be a great hardship and injustice to reverse your previous judgment.

Your petitioner, therefore, humbly submits that the matter be again taken under your consideration, as the amount of revenue which could by any possibility be derived from it would not compensate for the annoyance the trade would be put to. Your petitioner may here mention that, having reported your decision to two of the largest patent medicine houses, the reply has been that they shall at once give up its sale, and your petitioner has reason to believe that this will be the case with most druggists throughout the kingdom.

Your obedient servant.
ROBT. WATERS.

Inland Revenue, Somerset House, 31*st August*, 1865.

Sir,—The Board having had before them your further application of the 3rd instant, I am directed to acquaint you that it had appeared to them, from their previous information, that your preparation "Orange Quinine Wine" was sold as a beverage, and not as a medicine. But, after further inquiries, they are inclined to think that it is more properly classed with medicines, and that the patent medicine licence and stamped label are required for its sale.

This, however, does not make any substantial difference in the decision of the Board as already expressed. They have already stated that, if the patent-medicine stamped label and licence are used, they will not require a British wine license to be taken out by the vendors of the orange quinine wine; the British wine licence-duty would be imposed only in cases where the vendor, by neglecting or refusing to use the patent-medicine stamped label and licence, might show that he sells the orange quinine wine rather as a beverage than as a medicine.

I am, Sir, your obedient servant,
ADAM YOUNG, Assistant Secretary.

It will be observed that the decision of the Commissioners, or at any rate the form in which it is expressed, in this case, differs essentially from that communicated on the former occasion. This decision, it is true, relates only to one particular preparation—Waters's quinine wine,—while the letter of December, 1863, related to medicated wines generally. It is possible that there may be something in the circumstances under which Waters's quinine wine is sold that renders it liable to the stamp duty, and which would not apply to the preparation as usually made and sold by chemists and druggists. We do not think our members need be under any apprehension, while they make quinine wine with not less than a grain of quinine to the ounce, and sell it without recommending it for any particular complaint, that any attempt will be made by the Excise to interfere with its sale. The Board admit that even Mr. Waters's quinine wine should be considered a medicine rather than a beverage, and its sale must therefore be subject to the laws relating to other similar preparations.

It may be useful for us to state here briefly what the circumstances are that ender a medicine liable to the stamp duty.

1. No medicine is liable if it be a simple uncompounded drug. The Acts im posing the stamp duty apply only to compounded or prepared medicines.

2. Secret medicines or nostrums, sold as such, are liable to the duty.

3. Medicines that are represented to be prepared exclusively by the person whose name they bear are liable.

4. Any medicine that is recommended, on the label, or on a handbill, or by public advertisement, as a remedy for the cure or relief of any disease, is liable.

"The law is interpreted leniently with regard to ordinary domestic remedies, such as antibilious pills, cough pills, aperient pills, stomachic powder, essence of ginger, etc., which are sold by Chemists without any pretensions to exclusive right or mystery in the preparation. But if the words 'prepared only by A. B.' be used, then A. B. is liable, as the maker of a nostrum exclusively prepared by himself. Even if the formula or mode of preparation be publicly known, and the original maker or inventor state that the genuine article is prepared only by himself, all others being spurious, he is liable, as a person claiming superiority over all others. Such preparations as liquor opii sedativus, liquor taraxaci, liquor sennæ, etc., although each maker may profess superior skill in the manipulation, are not liable, because these medicines are not sold as nostrums for any specific purpose, but are comprised among the preparations ordinarily prescribed by medical men and used in dispensing establishments. But if such medicines, or even preparations of the Pharmacopœia, be sold with labels or directions recommending them for any particular disorder, they come within the *fourth condition* above-named, and are therefore liable. This condition has given rise to a variety of questions and attempts at evasion, but the only qualification allowed is the following:—It is granted to be a matter of necessity that every medicine shall be so designated that it shall be distinguishable from other medicines. For example, the words 'cough pills,' 'antibilious pills,' etc., may be used to identify the pills; but the words 'pills for a cough,' or 'pills for bilious complaints,' etc., make them liable, because the license to use such expressions would open the door to an extensive evasion of the Act."

THE BENEVOLENT FUND.

Our present Journal records an important epoch in the progress of the Benevolent Fund of the Pharmaceutical Society; the commencement of a system of continued relief, by way of annuities to necessitous members, which has been a long deferred hope among the supporters of that fund,—a hope, dating back from the very day of incorporation, sometimes damped by the apparent want of energy displayed in carrying out this object of the Society, but ever and anon revived and now crowned by success.

Quietly, and almost unobserved, the Council has been enabled to relieve, from time to time, urgent cases of distress which have been brought before it, and, in the annual reports, members and associates have been reminded that as the Society advanced in age, so would its components individually; but, that age which brought strength to the body corporate, might disable some of its members, and, consequently, larger demands might be expected on the Benevolent Fund. Happily, a conviction of this kind seems to have forced itself on some of our friends accustomed to watch and take part in the noble institutions formed in this metropolis to stimulate and increase, by concentration and organization, the private benevolence of individuals; and to this may be attributed the great increase in subscriptions and donations to the fund in the last two or three years, which increase has seemed to justify the Council in departing from the original resolution to withhold annuities until the invested capital of the Benevolent Fund amounted to £10,000. Two pensions, of £30 per annum, are now appropriated, and will, we hope, carry comfort to the homes of the recipients. The number of voters, on this occasion, gives proof of the general interest taken in the matter, and the commencement of annuities will, undoubtedly, draw attention to the fund; and, probably, when the Council is enabled to announce its ability to add to the number of annuitants, more applicants will present themselves than we have now had. By prudent guardians of a benevolent fund such a contingency should be well considered; it should ever be remembered that such a fund is not for the present only, but for all time; that, however hard it may be, a strict line should be drawn between "capital" and "yearly income," and that the dispensers of the charity, for the time being, are the *trustees* alike for the present and the future.

By the bye-laws of the Society, it is enacted, that "*Donations in aid of the Benevolent Fund shall be invested in Government or real securities; and no part of the invested capital of such Fund shall be distributed among the recipients of relief.*"

The interest only of such investments, and the annual subscriptions in aid thereof, are applicable towards the relief of distressed members or associates of the Society, and their widows and orphans.

Far be it from us to damp the kindly feeling of those who bear the purse. We know there is no harder task than to utter the ungracious "*No.*" It requires an amount of moral courage, which some men find it hard to exercise in the presence of distress; and in reminding them of the sterner side of their duty, we desire also to stimulate all who should be contributors to the necessities of their poorer brethren to such action as will render that difficult "*No*" unnecessary.

We might, too, dwell on the hope which we yet entertain of seeing the Benevolent Fund of the Pharmaceutical Society of Great Britain made available for the whole body of those who practise pharmacy in Great Britain, and the consequent necessity for enlarging that fund; for we believe time will soon prove to those who have doubted our sincerity that the Pharmaceutical Society is governed by no narrow views in its efforts to advance Pharmacy in this kingdom, but that the same spirit which animated our founders in 1841, to promote a uniform system of education of those who should practise pharmacy, and union for the protection of those who carry on the business of chemists and druggists, still animates us.

It has been no small success to consolidate and guide the Society to its present position, and render it a fit foundation for the superstructure which sooner or later will be added; and, if advantages have accrued to those who have contributed to that success by membership only, as well as to those who have engaged more actively in the work, we think that fact should be taken as a proof of the honesty of purpose of the latter. Superficial indeed must be the observation of those men who say there is a desire to maintain the Pharmaceutical Society as a "clique," composed of the "*élite*" of the trade only.

The Society was established for all who fairly and honourably exercise the profession or trade of Pharmacy in Great Britain, and its constant desire has been to embrace all.

MENDACIOUS PUFFING.

The art of puffing has been carried to a magnificent height. Not content with placarding his announcements on walls and hoardings, the aspiring advertiser now displays himself on the roofs of omnibuses, both within and without. Some months ago, we were startled to see upon one of these vehicles the word OPOPONAX, in letters a foot high. What could it mean? opoponax, an obsolete drug of most repulsive odour,—who in his sober senses could prevail on the public to purchase *that?*

But the mystery has been resolved by the advertisement of an enterprising perfumer, claiming a doctor's degree, who after seventeen stanzas, worthy of an Aldgate tailor, ventures the following assertions:—That *Opoponax Chironium*, a plant of Sicily, produces flowers of exquisite fragrance, some of which in a dry state were brought from Mexico (!) "*after the return of the British and Spanish Expedition*," by "*a well-known amateur botanist, distinguished for his services at sea*," and that this circumstance has led to their importation as an article of commerce, and use as the basis "*from which is distilled the now famous opoponax!*"

As all this is given as serious scientific information, and rendered plausible by a reference to Professor Balfour, and a quotation from Bescherelle's French Dictionary, besides half-a-dozen words of Greek, it might really be supposed a piece of curious and trustworthy intelligence, instead of most mendacious puffery. It might certainly strike a thoughtful reader as somewhat puzzling, how the "*British and Spanish Expedition*" should bring from *Mexico*, the dried flowers of a plant of Greece and Italy; how this plant, which is remarkable for its fœtid juice, should afford a perfume of extraordinary fragrance; and how, if the opoponax plant exists in Mexico in sufficient abundance to be collected, it has never been obtained by any one of the numerous botanists who have traversed that country in all directions, but that its discovery was reserved for the "well-known amateur" of naval celebrity. But these are little matters into which it is not to be supposed that the public will inquire too nicely, though it is well to throw out a wholesome caution about dangerous imitations, and the necessity of remembering where the only genuine article can be purchased.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, 4*th October*, 1865,

Present—Messrs. Bottle, George Edwards, Evans, Hanbury, Mackay, Morson, Orridge, Randall, and Squire,

The following were elected—

MEMBERS.

Alexander Barnett ....Buxton.
William Gunn ....Dunse.

EXAMINATION, *October* 11*th*, 1865.

(Registered as Pharmaceutical Chemists.)

Angior, John ....Liverpool.
Averill, Josiah...Stafford.
Best, James ....London.
Bienvenu, John ....Southampton.

Jones, Henry	Llanfachraith.
Lenton, William Henry	East Dereham.
Stokoe, Thomas	London.
Williams, Cornelius	Pembroke Dock.

EXAMINATION, *October* 18*th*, 1865.

MAJOR (Registered as Pharmaceutical Chemists).

Hughes, James	Jamaica.
Mumford, Alfred	Westbury.

MINOR (Registered as Assistants).

Ball, George Stephen	Leicester.
Cave, Alfred	London.
Llewellyn, John	Cowbridge.
Sandell, Thomas Oliver	Brighton.
Smith, Edward	Brighton.
Walton, Ralph	Sunderland.

REGISTERED APPRENTICES.

Name.	Residing with	Address.
Agnew, Ernest	Mr. Spencer	Southsea.
Baines, William Duckle	Mr. Stokoe	London.
Battle, John Scoly	Mr. Battle	Lincoln.
Bentley, Michael John	Mr. Glew	Selby.
Bird, Robert	Messrs. Randall and Son	Southampton.
Brigstock, John William	Mr. Ekins	Huntingdon.
Dutton, Peter	Mr. Cumine	Southport.
Fairbank, Joseph	Mr. Ayre	Thirsk.
Fuller, John William	Mr. Morris	London.
Heald, John Fenton	Mr. Haldane	Wakefield.
Jones, Rowland Pritchard	Mr. Jones	Llanrwst.
Litten, Henry	Mr. Gordelier	Sittingbourne.
Michell, I. J. C.	Mr. Hogg	Bideford.
Morris, Enoch James	Mr. Davies	Llandilo.
Paffard, Walter H.	Mr. Arnold	Blackburn.
Robinson, Alfred	Mr. Hollier	Dudley.
Sharples, Charles Heaton	Mr. Sharples	Preston.
Simpkins, Tom Lloyd	Mr. Fuller	New Shoreham.
Steel, Frank William	Mr. Fincham	London.
Swain, William Thomas	Mr. Glew	Selby.
Thibou, James Cox	Mr. Wakeham	Dittsham.
Walker, John Wesley	Mr. Walker	Maidenhead.
Weaver, Theophilus	Mr. Spencer	Birmingham.
Woolfield, John	Mr. Hutchinson	St. Alban's.

EXAMINATION, EDINBURGH, *September* 21*st*, 1865.

(Registered as Pharmaceutical Chemists.)

Barnett, Alexander	Buxton.
Gunn, William	Dunse.

MINOR (Registered as Assistant).

Matthew, William H.	Belfast.

PHARMACEUTICAL MEETING.

Wednesday, October 4th, 1865.

MR. SQUIRE 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 Journal of the Society of Arts.
Proceedings of the Linnæan Society.
The Veterinarian.
The Educational Times.
Proceedings of the Medico-Chirurgical Society.
L'Union Pharmaceutique.
Bulletin de la Société Botanique de Paris. From the Editors.
Recherches Chimiques et Physiologiques sur la Fève du Calabar. Par Dr. A. Vée.
Vorträge über die Florenreiche oder Imperia Floræ. Von Dr. C. F. Ph. Von Martius.
Zur Darstellung Mikroskopischer Objekte. Von G. Reuling.
Kleine Cinchonologische Notizen. Von Dr. P. Phœbus.
Proceedings of the American Pharmaceutical Association, 1864.
Report upon the Forests of the Punjab and the Western Himalaya. By Dr. Cleghorn.
The Dental Licentiates' Directory and Local List. By A. Hill, L.D.S.
The Book of Perfumes. By Eugene Rimmel. From the Authors.
Receipts for Preparing and Compounding the Principal Medicines made use of by the late Mr. Ward. By John Page, Esq. From Mr. Whipple.
A Patent Drug-powdering Machine. From Mr. Goodall, of Derby.

The CHAIRMAN said that in the unavoidable absence of the President and Vice-President, he had been asked by his colleagues on the Council to take the chair on that occasion. He had much pleasure in doing so, and was glad to be able to welcome, at this the first evening meeting of the session, so numerous an assemblage of visitors, Pharmaceutists, and students, as he saw around him; he trusted that the attendance would be as good throughout every meeting of the new session, and that there would be no dearth of papers to be read and discussed. The importance of such meetings must be evident to every one. The principal business of this—in accordance with the proceedings of previous years—was the distribution of prizes. He would now call upon the Professors to make their reports upon the classes of last session, and announce the successful candidates for medals and other honourable distinctions.

CHEMISTRY AND PHARMACY.

Professor Redwood said he would not trouble the meeting with a lengthened report with reference to his class. He could speak favourably of the general conduct of the pupils, and their attendance and diligence had been quite satisfactory, but, on the whole, the value of the answers furnished at the examination had not been quite equal to those of former years.

The questions and awards were as follows:—

1. What is the specific gravity of a liquid, the weight of 1 fluid ounce of which is 500 grains?
2. What is the latent heat of the vapour of water at the following temperatures respectively, namely, 112°, 212°, and 312°?
3. What is the specific heat of Mercury in relation to water taken as 1·000?
4. What is the best method of obtaining Phosphorus in a pulverulent or finely granulated state?
5. If 3 drops of essential oil of pimento, or 3 grains of camphor, or 5 grains of mercurial ointment, were ordered to be made into a pill, how, in each of these cases, would you give to the substance ordered the pilular consistence?
6. Describe the condition in which Bismuth exists in nature; the process by which it is obtained as commercial Bismuth; the impurities frequently present in the metal as met with in commerce; and the best means of freeing it from these impurities.
7. Describe the Pharmacopœia process for the preparation of Arseniate of Iron.
8. Give a sketch of the principal methods by which artificial alkaloids have been obtained.

Medal ....Alfred R. Hall.
Certificate of Merit ......Frank Oldfield.
,, ...Francis C. Clayton.

BOTANY AND MATERIA MEDICA.

Professor Bentley said that he had, as on all previous occasions, a most satisfactory report to make of the class of Materia Medica and Botany. He found that no less than seventy-three students had been in attendance during the last session; which fact was in itself substantial evidence of the desire that existed, throughout the country, among Pharmaceutical students for education; and it must be most gratifying to those who had, through good report and evil report, maintained the educational resources of the Pharmaceutical Society. It was now universally admitted that the future position of the students of Pharmacy, in this country, must depend upon their receiving an education suitable to their professional calling. Professor Bentley said he could also speak generally of the good conduct, diligence, and progress of the students, both at the Pharmaceutical Society and at the Royal Botanic Gardens. He then referred to the Terminal Prize Examination: at this, ten candidates presented themselves, all of whom passed with credit, and six obtained distinctions, of which they might justly be proud, for they had fairly and honourably gained them. The two first candidates were so nearly equal, that the Council, at his recommendation, had awarded a medal to each; and most worthy were they both to be placed in the list of those students who had in former years gained the same distinctions as themselves.

The questions for the written examination were as follows:—

1. Describe the different kinds of Prosenchyma; and mention the plants, and parts of plants, in which they are respectively found.
2. What are the distinctive characters between roots and stems? Define the following: —Epiphyte, Parasite, Bulb, Corm, Tuber, and Rhizome.

3. Define the following:—centripetal, centrifugal, capitulum, cyme, gibbous, spur, pappus, papilionaceous, didynamous, carpel, placenta, and thalamus.
4. What is the Fruit? How would you distinguish small fruits from seeds?
5. What are the botanical and geographical sources of Officinal and Savanilla Rhatany? show how they may be distinguished from each other; and mention the active constituents, medicinal properties, and officinal preparations of Rhatany.
6. What is Cinnamon? how is it obtained? what are the characters by which it may be distinguished from Cassia? and what are the officinal preparations into which it enters as an ingredient?
7. What are the botanical and geographical sources of Scammony? Describe its physical and chemical characters, when pure; and mention the substances commonly employed as adulterants, and the means by which they may be detected.
8. Give the essential characters of the following Natural Orders, and enumerate the officinal plants which they respectively contain:—Rutaceæ, Cucurbitaceæ, Gentianaceæ, Solanaceæ, Euphorbiaceæ, and Liliaceæ.

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 paniculatum—Delphinium Staphysagria—Nymphæa alba—Papaver somniferum—Papaver Rhœas—Chelidonium majus—Sinapis alba—Sinapis nigra—Althæa officinalis—Ruta graveolens—Chærophyllum temulentum—Conium maculatum—Ecbalium officinarum—Knautia arvensis—Artemisia Absinthium—Anthemis nobilis—Lactuca virosa—Lobelia inflata—Hyoscyamus niger—Atropa Belladonna—Datura Stramonium—Nicotiana Tabacum—Solanum nigrum—Solanum Dulcamara—Borago officinalis—Symphytum officinale—Marrubium vulgare—Origanum vulgare—Lamium album—Funkia ovata—Lilium bulbiferum—Veratrum nigrum.

The medals and certificates were awarded as follows:—

MEDAL } Equal	Frank Oldfield.
MEDAL } Equal	Gilbert W. Selfe.
CERTIFICATE OF MERIT	Francis C. Clayton.
”	Sidney Applegate.
”	Henry W. Harris.
”	John A. Thomas.

PRACTICAL CHEMISTRY.

Dr. ATTFIELD made a few remarks explanatory of the composition of the substances mentioned in the several questions for examination. The position of a student, he said, was not wholly dependent on the result of examination, it was much influenced by the character of his daily work during the period of study. Mr. Rose, who had obtained the highest place, would probably not be unwilling that it should be said of him, that though not the most brilliant man of the session, he was eminently the best worker; he had not been absent one day during the whole term of pupilage. All the students—and he (Dr. Attfield) was glad to say they were many, the number increasing every year—had displayed a fair amount of ability and diligence while at work; but he was obliged to state that the attendance of some few was so bad, that it had been found necessary to organize a plan by which the attendance of students was registered, and the results laid before the Council every month. The register influenced the granting of certificates, and a copy could at any time be forwarded to the parents or other immediate friends of a student. To work constantly, as well as diligently, was a duty which a student owed to all around him as well as to himself. His fellow-students would be influenced for good or evil, according as his actions were right or wrong. His friends, probably those who had worked hard that he might enjoy advantages not obtainable when they were youths, expected him to grasp those advantages to the utmost. He owed it to the Institution with which he had connected himself, for the future Pharmaceutical Society would be but an aggregation of individuals like himself, and would be raised or endangered according as his influence expanded or collapsed. His own profession, too, if not elevated by his labours, must not be degraded by his ignorance: the advancement of Pharmacy to its true position in this country, an object so greatly to be desired, could only be thoroughly accomplished by the educated intelligence of its followers. It behoved every student of Pharmacy, therefore, to work assiduously while he had the chance. To his future supporters in business, he owed the duty of diligence for their health, and, indeed, their lives would frequently be in his hands.

The questions and awards were as follows:—

1. Analyse the solution supplied to you, and arrange your results in the manner shown below:—

Bases.	Acids.	Other Constituents.	Traces.

2. Examine the solid, stating the results in a similar manner.
3. Examine the specimen of urine, stating if it be healthy; if not, describe your experiments leading to the opposite belief.
4. A portion of the contents of a stomach is given to you; examine it for the ordinary mineral poisons.
5. Determine the strength of the specimen of Liquor Ammoniæ.
6. Write the prescription for the medicine you have supplied to you (omitting quantities).

Medal..............................Alfred Rose.
Certificate of Merit.........Francis C. Clayton.
" ....Henry W. Harris.

PEREIRA MEDAL.

This medal is awarded to the student on the List of Honours in the Major Examination, who has obtained the highest number of marks during the session.

The following are the names of those who passed in honours, with that of the successful candidate for the medal:—

Amoore, Charles Robert.
Barrett, James.
Clayton, Francis Corder.
Eminson, J. M. O.
Oldfield, Frank.
Preston, Joseph Classon.
Rickards, Edwin.
Medal...Rose, Alfred.

PRIZES FOR HERBARIA.

Professor Bentley, upon being called upon by the Chairman, announced the result of the competition for the Herbaria Prizes. He said that three collections had been forwarded, and of these, two had, upon his report to the Council, received honourable distinctions. The first in order of merit was that of James

W. White, a registered apprentice of the Society, residing with Mr. T. B. Groves, Pharmaceutical Chemist, Weymouth. This contained four hundred and twenty-three specimens of British plants, which were well preserved and named, and included many rarities; altogether it was a meritorious collection, and Mr. White had well earned the silver medal which had been awarded to him. The second in order of merit was that of Isaiah Tansley, a registered apprentice of the Society, residing with Mr. James Fisher, of Lowestoft; this, although a very inferior collection to the first, was so well arranged and preserved, that a certificate of honour had been awarded to Mr. Tansley.

The following were the awards:—

Silver Medal ....James W. White.
Certificate of Honour......Isaiah Tansley.

Mr. D. Hanbury, although sorry to disturb the agreeable flow of compliments that had set in, observed that he thought it would render an important service to the gentlemen who had formed the Herbaria, now presented to the notice of the meeting, if the Professor of Botany would state in a report (not necessarily to be published) in what points each herbarium was susceptible of improvement. Such criticism would be most useful to the young botanists, whose zeal and diligence all could commend. He hoped he should not be considered as desirous of fault-finding, if, for the sake of illustration, he pointed out that amongst the twelve or thirteen specimens suspended before the meeting, several were deficient, in presenting the radical leaves of the plants or their fructification, or were so mounted as not to give a correct idea of the manner of growth of the plant.

Professor Bentley, in reply to Mr. Hanbury, said that he had on several previous occasions given such information to the competitors for the botanical prizes, and should be always glad to do so in future to any one who would apply to him. As to the specimens referred to by Mr. Hanbury, he had purposely selected them from the general collection, with the intention of pointing out privately to the collector (who he hoped and expected would have been present to receive his medal) in what particulars they might have been improved. Professor Bentley added that we must not expect perfection in the collection of a young apprentice, and he thought we should be careful not to discourage the efforts of those who, working under difficulties, sent up for competition such meritorious collections as those now before the meeting.

JACOB BELL SCHOLARSHIPS.

No candidate presented for the Senior Schlorship.
Five candidates competed for the Junior Scholarship.
There being no Senior candidate, two Junior Scholarships were awarded to—

Sidney Applegate.
Alfred R. Hall.

The questions for the written examinations were as follows:—

LATIN.

1. Decline the following nouns, viz.:—*Herba*, *filia*, *granum*, *æther*, and *species*.
2. Decline the comparative and superlative of *parvus*.
3. Give the perfect tense and passive participle of the following verbs, viz.:—*do*, *facio*, *contundo*, *decoquo*, *misceo*, *consumo*, *demitto*, and *dejicio*.
4. Translate the following passage from Cæsar, 'De Bello Gallico,' lib. i. par. xli.:— *Quum* to *pervenerunt*.

"Quum hostium acies à sinistro cornu pulsa, atque in fugam conversa esset, à dextro cornu vehementer, multitudine suorum, nostram aciem premebant. Id quum animadvertisset P. Crassus adolescens, qui equitatui præerat, quòd expeditior erat, quàm hi qui inter aciem versabantur, tertiam aciem laborantibus nostris subsidio misit. Ita prælium restitutum est, atque omnes hostes terga verterunt; neque prius fugere destiterunt, quàm ad flumen Rhenum millia passuum ex eo loco circiter quinquaginta pervenerunt."

Or, the following from the London Pharmacopœia:—

"Gummi-resinæ pro optimis habendæ sunt, quæ veniunt adeo sinceræ, ut nullâ purificatione opus sit. Quæ vero minùs puræ esse videantur, in aquâ coquendæ sunt, donec mollescant, et prelo exprimendæ per pannum cannabinum; dein seponendæ ut pars resinosæ subsidat. Liquorem supernatantem effusum balneo aquoso consume, adjectâ sub finem parte resinosâ, quæ cum parte gummosâ in unum coeat."

ARITHMETIC.

1. Express the following vulgar fractions in decimal, viz. $\frac{1}{4}$, $\frac{3}{4}$, $\frac{7}{8}$, $\frac{13}{16}$.
2. Multiply 8·38 pounds avoirdupois by 65, and give the product in hundredweights, quarters, and pounds.
3. A fluid ounce of water weighing 837·5 grains, what wll be the weight respectively of an imperial pint and a fluid drachm ?

ENGLISH COMPOSITION.

1. Write some remarks upon one of the following subjects:—
   A. The advantages of a knowledge of chemistry.
   B. The ballot.

BOTANY AND MATERIA MEDICA.

1. Define the following:—Root, stem, tuber, rhizome, corm, and bulb.
2. Give a general sketch of the structure of an acotyledonous stem.
3. How would you distinguish Russian, East Indian, and English rhubarbs from each other?
4. How would you distinguish aconite root from horseradish root? Mention their botanical sources.

CHEMISTRY AND PHARMACY.

1. What are the principal products of the combustion of coal gas?
2. Explain what occurs in the slaking of lime, and state the cause of the heat produced in the process.
3. What is the acid contained in lemon-juice, and how may this acid be obtained in a separate state?
4. What is the composition of carbonic acid, and how would you distinguish it from nitrogen?
5. Describe the processes of the British Pharmacopœia for the preparation of Liquor Arsenicalis, and state the proportion of arsenious acid contained in it.

At the conclusion of the meeting, Mr. Goodall exhibited and explained the construction and use of his drug-grinding machine.

BETTS'S PATENT CAPSULES.

On Thursday, October 5, a public meeting of Chemists and Druggists, Patent Medicine Vendors and Perfumers, was held at the house of the Pharmaceutical Society, to take into consideration the present position of these trades with respect to the sale of capsuled articles; Mr. Peter Squire in the chair.

The Chairman, having read the notice convening the meeting, observed that it was for them to discuss the question, and adopt such resolutions as they might consider necessary with reference to the object they had in view.

Mr. Daubeney moved the first resolution. He said, there could be no doubt that the law, as it at present stood, with reference to the use of these capsules, was very injurious to retailers of capsuled articles. There were several manufacturers in England and France who made capsules precisely similar to Betts's, with no distinguishing mark, except in some instances an infinitesimal letter, which was only to be discovered when carefully examined with a glass. He had one of Betts's capsules which had no distinguishing mark that could be discovered either with or without a glass, and therefore it was that they considered the present proceedings taken by Mr. Betts against the retailers as most unjust, unfair, and oppressive. If Mr. Betts had given notice by advertisement that after a certain date he should enforce the rights secured to him by his patent, and that he intended to proceed against all infringers, it would have been a straightforward mode of proceeding, and they would all have cheerfully bowed to his decision, and have guarded themselves against such proceedings; but to take proceedings without notice against innocent persons was exceedingly harsh and unjust. The patentee stooped, it appeared, to the meanest practices to entrap the retail dealers. A gentleman informed him (Mr. Daubeney) on Saturday that a person called at his shop and ordered one of Rimmel's 3*s.* 6*d.* capsuled toilet articles. He told the customer that he had not got it in stock, but he would procure it for him. He did so, and sent it to his customer, and the result was that it got into the patentee's hands, who had since commenced an action against the retailer for an infringement of his patent. It was a most disgraceful proceeding to inquire for an article, and when it was found not to be in stock to allow the retailer to procure it, in order that an action might be commenced against him for what the retailer was perfectly innocent of. The proceedings against the retailers had assumed a wholesale character, for within four or five days three or four van loads of articles were purchased for the purpose of commencing legal proceedings against the unfortunate and innocent vendors. It appeared that some man had gone from shop to shop and purchased articles and sent for them the following day, until he had collected enough to fill three or four vans. He had not confined his operations to chemists and druggists, but he had patronized pickle merchants, publicans, perfumers, and others. Although they could not hope for any alteration in the capsule trade, still, so far as the retailer was concerned, they might ask for some protection by which the different capsules might be known, and if not, they had better try and do without them altogether. Mr. Betts, who claimed a priority of right to make capsules, ought to distinguish his manufacture by some mark, so that the retailer might know whether or not he was infringing the patent.

Mr. Hart seconded the resolution. It was both urgent and imperative that some protection should be given to the innocent retailer. If the Patent Laws permitted bills in Chancery to be filed against persons who had unknowingly committed an offence—if it can be called an offence—small in comparison with the heavy bill of costs that would be incurred, they could only be looked upon as unjust and oppressive, and the sooner they were altered the better. He knew nothing of Mr. Betts or his capsules until it was brought to his notice by a bill in Chancery; and had it not been for the Pharmaceutical Society and his friends, he had no doubt he should have settled the matter by paying the costs of the action. It was a monstrous anomaly if the law allowed a bill to be filed in Chancery for the sale of an article covered with a bit of metal of which he knows nothing. It would therefore appear, that when they considered the number of patented articles sold by Pharmaceutical chemists and others, they were constantly treading on dangerous ground. They did not want to go into the question of taking away the remuneration of a man's brains by the abolition of the Patent Laws, but they ought not to be in so much danger and to be surrounded by so many difficulties in the sale of certain small articles in a chemist's shop. Some of them would no doubt be victims, and mulcted in large sums, but there would be thousands who would be saved, and have to thank them for standing in the front rank. This discussion and agitation of the subject must lead to some beneficial remedy.

Mr. Hills remarked that he thought the resolution proposed would be all very well if they had been all convicted. He did not think that they were altogether wrong, and therefore he should like to try the point. He was not aware if any of the defendants had compromised Mr. Betts's claim.

Mr. Daubeney said that he had compromised it under the advice of his solicitor.

Mr. Hills said he should like to have the question tried, whether an innocent man who sold a packet with a capsule of which he had no knowledge was liable to be harassed in the manner Mr. Betts was harassing the retailers of this country. The resolution, it appeared to him, rather affirmed a foregone conclusion. He was for protecting the man who had a patent, as the law stands; but the man who infringed the patent ought to pay, and not the innocent retailer, and for that purpose he added his name to the defence fund.

Mr. Daubeney said Mr. Betts had commenced proceedings against both.

Mr. Hills said the retailers were the innocent parties; not so the manufacturer, who knowingly infringed the patent. He should like to hear Mr. Flux's opinion upon the subject, and if the question would be tried.

Mr. Flux (solicitor) said that as Mr. Hills had asked him whether the suits which Mr. Betts had commenced were to be tried, he thought it only right to say that a great many gentlemen had done as Mr. Daubeney had done. They had taken eminent advice, and acting on it they had compromised their suits by paying handsome sums and costs, thereby affording infinite encouragement to Mr. Betts to pursue that system from one end of the country to the other. He could not with unbounded confidence say that these suits could be successfully defended, but he could say that he defended them with a fair amount of confidence as to the ultimate result. According to the *reductio ad absurdum* of the proposition, Mr. Betts might have a *primâ facie* case in a court of equity, so that he might possibly succeed in getting a decree; but if he did, it would be, to the best of his (Mr. Flux's) belief, but a naked decree, without costs, against the defendant, who would perhaps have to pay them himself, because they would be reduced to such a ridiculously small amount. Mr. Betts ought not to have gone to court systematically, as he had done, with such a large batch of claims :more than twenty-five claims all struck off in blank as it were, the only change being the substitution of one gentleman's name for another. So much for Mr. Betts's form of proceeding. But now, looking at the whole matter, he should be able to prove that which perhaps was unknown to those professional gentlemen who had advised on this matter. Mr. Betts had not a patent for capsules, but for the metal of which capsules could be made. He should be able to prove conclusively that Mr. Betts had not only sold large quantities of his metal, but millions of capsules made of his metal, without any distinguishing mark being put upon them; and it was within his knowledge that Mr. Betts's own agents could not tell, when a capsule was placed in his hands, whether it was made by him or not. Mr. Betts's confidential agent was one day in his (Mr. Flux's) office; and by way of parenthesis he might say that he believed at that time they had come to an amicable termination of the matter, and that it would have been a drawn battle and peace would have been established; but it was impossible to say in connection with these matters when they had arrived at a conclusion, and he now believed they would have to fight to the end. On the occasion referred to, they discussed the possibility of distinguishing between a genuine and what was not a genuine article. He (Mr. Flux) had had supplied to him, and with the means of proving it, Betts's plate and his capsules. He placed them in Mr. Campbell's hands, and said to him, "Tell me, are they Mr. Betts's manufacture or not?" Mr. Campbell turned them over and over again, and said, "If I had a microscope, perhaps I could tell." He then said to him, "Then if that be the case, tell me how an outsider can say that these are Betts's capsules or not." To which he replied, "Perhaps they cannot tell." He repeated his question, "Tell me, without a microscope, are they Betts's manufacture or not?" and he replied, "They are not." Upon which he (Mr. Flux) said, "Then I can prove most distinctly that they are." Now, in the course of such a proceeding as that, and in his having sown broadcast over this and foreign countries capsules of his manufacture without the slightest distinguishing mark, it occurred to him (Mr. Flux) that to prove that the capsules proceeded upon were an infringement of the patent would be a very difficult thing for Mr. Betts to do; and at any rate it would be capable for the defendants to show that in selling these capsuled articles they acted in perfect innocence, and that they were in a trap with Mr. Betts himself had laid for all the world—he did not mean to say openly and purposely—but which, nevertheless, was in effect a trap into which the retailers had fallen. In the face of that, and according to the law of justice which he had ever seen administered in the Court of Chancery, he could not see how the defendants could be cast in costs. At any rate, he had a strong conviction that Mr. Betts would have to pay for it. So much, then, for the matter that had been referred to him by Mr. Hills's question; and now he would say a few words with reference to the proposition before the meeting. Mr. Betts's patent was not, as he had before said, for capsules, but for the metal of which they were made. In the ordinary retail trade he did not think they could take up an article in any one of their shops that might not, for what they knew, expose them to a Chancery suit in half-a-dozen different directions. The capsule on the top of the bottle might expose them to a suit in Chancery, not because of its being a capsule, but because it was made of a given metal. The pot, the label, even the paper and the colour of the ink, might be registered designs, and render them liable to as many Chancery suits; and really, if such suits as these could prevail, they could not conduct the ordinary retail trade of the country with any amount of safety. Now with regard to the international part of the question. Take, for instance, Vichy water. By the law of France, he believed Vichy water must be capsuled.

Mr. Hills said it was now covered with tin. They had given up the use of the composition.

Mr. Flux: By the law of France Vichy water must be capsuled, but by the law of England it could not be imported with it; without capsules it would be contraband leaving France, with capsules it would be contraband touching the shores of England. There were many articles which were imported from France that were never opened until they got into the consumer's hands, which might be full of explosive matter, in the way of Chancery suits. Now let them look at the question as it affected the trade in various portions of Great Britain. Betts's patent does not extend to Scotland. Messrs. Bennett, of Scotland, manufacture bottled beer, which they fasten down with metallic capsules, and sending it direct from Scotland to India they do not infringe the patent by the use of the capsules; they, however, received an order, the other day, for some beer to be sent to a foreign port, and as there was no steamer direct from Glasgow for that port, it was sent to Liverpool for transshipment into another ship to be taken to its destination. Now, by its arrival in the port of Liverpool, although it was never intended to be consumed within the realm, it was contraband. A Chancery suit has been commenced, and no doubt the injunction will be granted; and that being the case, it appeared to him that the resolution was fully supported, that the patent laws interfered with international trade, and materially embarrassed the retail trade.

The Chairman observed that as Mr. Flux had said that Betts's patent was for metal only, how was it that metal could not be used in any form? It appeared to him that the metal was to be applied to capsules only.

Mr. Flux said: Not at all. The patent was for the manufacture of metal by a given process—leaden plates coated with tin on either or both sides,—thus combining the malleability of lead with the cleanliness of the tin. Mr. Betts's father had originally a patent for capsules, but it expired long ago. There was now no patent for capsules as capsules in this country. The metal was applied for that and any other purpose.

The resolution was then carried unanimously.

Mr. Hovenden, jun., moved the second resolution, "That a petition, embodying the foregoing resolution, and detailing the proceedings referred to, and also praying for the amendment of the patent laws, be prepared and presented to Parliament."

They had heard the real nature of the case from the statements made by Mr. Flux and Mr. Daubeney. He had been in communication with several gentlemen upon the subject, and the universal opinion amongst them appeared to be that the suits ought immediately to have been compounded by the payment of certain sums of money to the patentee; but if they had done so, the manufacturer would have been liable also, and thus the patentee would have been paid twice for the same infringement. That being the state of the law, he considered it high time that some change should be made in it, and he thought the defendants had acted quite right in not compromising the matter. It had been said that the defendants should compromise the matter, and then go to the wholesale manufacturer and call upon him to reimburse the money out of his pocket; but very few of the retailers knew for what article they had been made liable, and to ascertain that, further expense and great loss of time would result to the retailer, in finding out to whom he was to apply to be refunded what he had paid. Supposing, however, the retailer were to find out the manufacturer, and call upon him to repay the £20 or £30 he had paid, the latter would very naturally decline to do so, for two reasons: one that if he paid it in one case he would be obliged to do so in innumerable other cases (and, in fact, the demands might be so numerous that he might be compelled to button up his breeches-pocket and take a trip on the Continent for a short time); and the other reason, that he denied his liability, and disputed that Mr. Betts had any patent. It was quite open for the manufacturer to say that as the retailer had thought proper to compromise the suit on his own responsibility, he must abide by the loss.

Mr. Patten briefly seconded the motion, which was carried unanimously.

Mr. Twinberow suggested that as Lord Stanley had taken an interest in the

Patent Laws question, and had been a member of the Royal Commission appointed to inquire into their working, his Lordship should be asked to present the petition to the House of Commons, and support the prayer thereof.

A brief discussion took place upon the suggestion, and it was ultimately arranged that the presenting the petition to Parliament should be left to the Committee to decide.

A vote of thanks to the Chairman was unanimously agreed to, and the proceedings terminated.

PROVINCIAL TRANSACTIONS.

ANNUAL MEETING OF THE LIVERPOOL CHEMISTS' ASSOCIATION.

The meeting of the Chemists' Association was convened at the Royal Institution on the 28th of September last, for the purpose of receiving the Annual Report of the Council and Treasurer, to elect officers, and transact other business.

The President, A. Redford, Esq., occupied the chair.

The Hon. Secretary, Mr. Martin Murphy, read the following Annual Report of the Council:—

The Chemists' Association still lives, and continues to increase in numbers and in usefulness with growing years. Your Council, as guardian of its welfare, rejoices in being able to report at the close of the sixteenth year of its existence, the prosperous state of the Association. The well-sustained interest of its proceedings indicates an increasing power, which promises to it a long life of usefulness—a fact that relieves your Council of any anxiety for the future.

Your Council regrets to have occasion for informing you, that since the last annual meeting, the Association has lost one of its most respected honorary members, Joseph Dickinson, M.D., F.R.S., etc., lately deceased. Your Council takes this opportunity of recording its high sense of the valuable services rendered by the late Dr. Dickinson to the Association during the early years of its existence.

During the session, eighteen new members joined the Association; seven withdrawals have been recorded in the same period, so that the Society is strengthened by an increase of eleven members. The attendance has been on a par with that of former sessions. The subjects discussed at the general meetings have been of a character calculated to advance the knowledge of the members in those sciences which the Association avowedly desires to cultivate.

In matters affecting the science and practice of pharmacy, your Council has not failed to use its best endeavours for their advancement. On the question of improved legislation for regulating the sale of drugs, your Council united with the Pharmaceutical Society of Great Britain to influence the Parliament in favour of the passing of Sir Fitzroy Kelly's Bill into Law; and although for the present those efforts have not had the desired success, yet hopes are entertained that they may tend to accelerate this very desirable legislation. Your Council embraced the opportunity to depute Messrs. H. S. Evans, F.C.S., and J. B. Edwards, Ph.D., to represent the Association at the Pharmaceutical Conference lately held in Birmingham.

Adopting the precedent of former sessions, your Council organized a conversazione, which was held about the usual time, and the results were very satisfactory.

The Library has been placed at the Royal Institution, Mr. Turner, the Curator, having undertaken the duties of Librarian. It is hoped the change will be convenient to the members. The increase of the Library induced your Council to provide a new case for its reception; and the Library and Museum Committee has devoted a good deal of attention to the arrangement of the books, by which the duties of the Librarian will be simplified, and the members will be readily furnished with any volumes required. This work was much needed; and, although your Sub-Committee has not yet fully completed its task, your Council hopes that it will be accomplished during the coming session.

The donations to the Library and Museum have been very valuable. Your Council desires to mention especially *a model dispensing counter*, presented by Joseph Ince, Esq., of London, to which Dr. Edwards has added the miscellaneous fittings,—the whole forming a unique and highly attractive addition to the already interesting contents of the Museum. Your Council has likewise to acknowledge a very handsome donation of useful and costly works presented to the Library by John Sykes Metcalf, Esq., Pharmaceutical chemist, of Kendal.

Your Treasurer, Mr. R. SUMNER, will read to you his Statement of the Finances of the Association, showing a credit balance of £31. 19*s*. 3*d*.

Messrs. ABRAHAM, REDFORD, SUMNER, and SHAW retire from the Council by rotation, and are eligible for re-election.

The PRESIDENT said that he could conscientiously endorse every statement of the Report, which was fully up to those of former years, and they might congratulate themselves upon the state of the Association. One very important advantage to members of the Association was the Library, and he thought the Council could not do better than to increase its value. It afforded him great pleasure to move that the Report be adopted, printed, and published.

The proposition was seconded by Mr. ROBINSON, and carried.

The meeting proceeded to vote for four members to fill the vacancy in the Council caused by the retirement from office of the gentlemen mentioned in the Report, and the result showed that these gentlemen were unanimously re-elected.

Mr. ABRAHAM rose, and thanked the members for the confidence they had again reposed in himself and coadjutors, and, acting upon that confidence, he desired to move a resolution expressing the obligations of the Association to those gentlemen who had lectured and read papers at their meetings during the past year. He knew very well that the preparation of those papers involved a very considerable expenditure of time, and it was comparatively few who had the ability and inclination to give the necessary labour with success. He believed the past session would bear comparison with any of its predecessors in the excellence of the papers, and in the really useful character of the information they conveyed to the Society. He had also to move that the thanks of the Association be given to the donors to the Library and Museum. Two presents had been referred to in the Report, which stood conspicuously eminent for their great value.

Mr. E. Davies, F.C.S., seconded the resolution, which was unanimously agreed to.

On the motion of Mr. WRIGHT, seconded by Mr. R. EVANS, a vote of thanks was passed, thanking the President, Secretary, and members of the Council for their services during the past year.

The PRESIDENT acknowledged the compliment in appropriate terms, after which

Mr. ABRAHAM asked the meeting to unite with him in passing a vote of thanks to the Secretary for the services rendered in his office during the past year. He added, that not only those who were intimately acquainted with the Secretary, but also those who had filled the office Mr. Murphy now held, knew how difficult the performance of the duty of Secretary was. Mr. Murphy had been most zealous and painstaking in his office during the past year.

Mr. SUMNER, Treasurer, and the PRESIDENT endorsed the remarks of Mr. Abraham. The vote of thanks was warmly accorded.

The SECRETARY returned thanks for the kind view Mr. Abraham and the members present took of his services, and added that the pleasure it gave him to aid the Association in any way was sufficient to induce him to give that aid whenever it was in his power to do so.

Mr. SUMNER moved, and Mr. ABRAHAM seconded, that a cordial vote of thanks be passed to Mr. Redford for the ability and courtesy with which he had filled the office of President. The vote was accorded by acclamation.

The PRESIDENT said, that in vacating the Chair for his successor, his term of office having expired, he thanked the members for the great kindness they had at all times shown him as President of the Society.

The SECRETARY announced the several donations received during the recess, and thanks having been accorded to the donors, the meeting terminated.

First General Meeting of the present seventeenth session, held October 12th, 1865, the President, A. Redford, Esq., in the Chair.—The President announced that the Council had re-elected the officers of the Association during the last session to serve during the present one. Mr. Henry Jackson was duly elected a member of the Association. Dr. Nevins presented his 'Analysis of the Pharmacopœia,' third edition, to the Library, for which the President accorded to him the thanks of the meeting. Dr. Nevins exhibited some of the pastiles used for producing the "Pharaoh's Serpents," and stated the material to be sulphocyanide of mercury. After illustrating the production of the "serpent," he explained the decomposition which took place, and the conditions which tended to cause the resulting substance to assume the serpent form, viz. that the sulphur and mercury of the sulphocyanide were volatilized in an oxidized state, and that the cyanogen was broken up into mellon and carbon, which constituted the body of the "serpent." Thus, assuming that 13 equivalents of the sulphocyanide of mercury entered into the decomposition, and that the mercury and sulphur were volatilized as sulphurous acid and mercurial vapours, the 13 equivalents of cyanogen were transformed as follows:—

$$13\,Cy = C_{26}N_{13} = C_{18}N_{13} + 8\,C.$$

The outer yellow coat of the "serpent" was supposed to be sulphide of tin or stannic acid produced from the tinfoil coating.

The President then proceeded to deliver his opening address as follows:—Gentlemen,—The seventeenth session of the Liverpool Chemists' Association is not to be inaugurated by the maiden address of a new President. By the vote of your council to which you did me the honour to re-elect me at your last annual meeting, I am again placed in the presidential chair. This distinction I would gladly have foregone in favour of our esteemed Vice-President, who is a far more worthy claimant. Indeed I should have declined the office were it not that I hesitated to appear unwilling to serve you as long as precedent seems of late to have assigned as the customary limits. In acceding to the very kind and flattering wish of your council, in disregard of the good excuses which want of health, time, and ability, afford, I am conscious of doing both you and your council an injustice. I ought to have been firm; but must now, in consequence of yielding, throw myself on your kind consideration and forbearance. Experience, which often adjusts the most formidable tasks to the feeblest agents, has done little to relieve your President. He still feels how inadequate he is to the duties involved in his office; and how impossible it is for him to realize an ideal every day becoming higher and more noble as examples multiply. More wisdom and force of character are requisite in the deliberation of your council than I can boast, and the interests of the Association generally demand more activity and attention for their advancement than I can command opportunity to bestow. So that I believe you are guilty of the very common mistake of placing one for your guide who would do better in the ranks—possibly might shine as a private, but must be conspicuously obscure as general.

But if your President thinks his own relationship to your Association might with great advantage have been changed, yet he rejoices to congratulate you that all his brother officers have been re-elected to serve you for another year.

A perpetually recurring novitiate, I am persuaded, in the important posts of Hon. Treasurer and Secretary cannot but be prejudicial to the advancement of our Association. For it appears to me that the value of these gentlemen to us, unlike that of a President, is in the inverse ratio of their freshness. Our tried, right trusty, and well-beloved Treasurer, who manages our purse so well, is likely to grow hoary in harness with honours thick clustering upon his brow. Nor less likely is our Hon. Secretary to secure, in double ratio, the well-merited praise of his last year's labours. His experience, aiding his natural sagacity, will powerfully augment the practical value of his services through the coming session. In providing for our evening meetings, he will not now feel as one who tries an unknown stream for the first time; he will be able to cast his line where the prey is certain to be taken, and thus his own labour will be play and your advantage the more marked.

I think that we may congratulate ourselves in looking back over the past session, to see that we have to a very great extent been independent of external aid.

What we have accomplished has been mainly done by our own members; and hence we may infer that our strength for future efforts remains unimpaired. Nay, let me say increased, for pre-eminently is it true in scientific matters, that "to him that hath it shall be given." To use is to have. To lay out for others is really to increase our own power to give. We can scarcely be said really to possess knowledge unless able to impart it. Or, as it has been said, "the intellect is perfected not by knowledge but by activity." It does appear to me that this feature of our Association is a most important one. We meet from time to time to develope hidden capabilities, to augment each other's stores of knowledge, for mutual encouragement and help—to elevate and be elevated. I do not think, of course, that our resources should be overstrained, but rather tested; and relieved and fostered by occasional foreign aid; while I do believe that it is wisest and best to exert ourselves for health's and strength's sake. I need hardly remind you how largely we are indebted to our distinguished friend Dr. Edwards, for the kind manner in which he has repeatedly come forward, at almost a moment's notice, to occupy the evening. And how invariably he is able, from his ample stores of knowledge, to instruct and delight us,—and this, too, not with old and trite discussions, but with all that is advanced in science and speculation in the great world of thinkers and workers in which he moves. His aid we may well be proud of, and I can scarcely over-state its value to our Society, which in him seems linked with the great minds and institutions of the metropolis, so constantly is he mingling with them and passing to and fro, like his own electric discharges, giving brilliancy to both poles. I cannot forget, too, the very great pleasure and information derived from the lecture of our esteemed Vice-President, Mr. Mercer, on "Nitrate of Potassa and the Nitrates." In him we have a staunch and able supporter of this Association whom we may well be proud of. His administration as Secretary will live in the memory of most, as the halcyon golden age of our associated life; and whenever he can be induced, or is able to undertake to occupy an evening, every member of this Association would do well to be on the benches, if he wishes not to lose a rich feast of knowledge. I regret much to be the cause of postponing his presidency for another year. We have also been much indebted to our friend and ready ally, Mr. Davis, for several interesting and valuable communications on the "Chemistry of Digestion," and on "Carbolic Acid." In this quarter we may look with confidence for further assistance. Mr. H. S. Evans, Mr. Murphy, and Mr. Tate and others, have read or contributed papers, and I must not forget to mention one paper in which I feel special interest. I refer to that on "Chemical Method," by Mr. J. F. Brown, lately residing with me. That paper was his maiden effort, and elicited very warm commendation from gentlemen competent to form a judgment on a subject somewhat abstruse and foreign to many of us. His success on that occasion forms a most encouraging example for our younger members, and I shall, if possible, take an opportunity before I close of referring to the subject again.

At the risk of being tedious, I must not omit from this hasty review of the session, to call up for a moment to your remembrance the last interesting and successful conversazione held in this building. On that occasion we had the presence of a distinguished chemist among us, Mr. William Crookes, whose name is so well known in the scientific world, and will be handed down to posterity, as the discoverer of Thallium. His audience was large and select, and in the course of a most interesting lecture were astonished and delighted with an opportunity of viewing the brilliant combustion of magnesium wire side by side with the lime and electric lights.

Dr. Edwards, as usual, was at no loss to bring forward on that occasion much that was novel and beautiful. Other gentlemen, too, gave us hearty assistance with contributions which were more or less scientific in their character and a source of much pleasure to investigate.

Mr. Crookes's visit, I think, was a gratification to us all, and contributed in no small degree to render the conversazione a great success, and to confirm the public opinion of the attractive nature of these scientific *noctes*, which we may now regard as an institution well appreciated and regularly expected.

The amount of good done by these pleasant gatherings is not to be gauged by the precise number of scientific facts or principles that may be understood at the time or remembered afterwards. Possibly by such a standard the maximum result attained might not be greatly plus—hardly a minus however. Though many persons did in a week's time sadly jumble their ideas upon the subjects treated of, yet we should rather look at the general stimulus which contact with new truths and the wonderful discoveries of science must surely give to all attentive minds. Inquiry is awakened, leading afterwards to more certain and definite knowledge; new ideas and impressions, and maturer views are gained of subjects partially known before, and so the mind is refreshed, the intellect strengthened, and the man as a whole is elevated to a higher and more commanding status. We, as a society, and the public too, are greatly indebted to those gentlemen on whom we can so well depend for arranging these entertainments—a work of such an anxious and onerous nature, and moreover a labour of pure love, that it deserves our highest esteem and best thanks.

I wish that I could advert with as much pleasure to what I may call the educational phase of the Association. With the unusual facilities which it affords our members for the study of chemistry and pharmacy, it is matter of surprise and regret that these subjects are so neglected. The Chemistry Class is in imminent peril of being given up or of collapsing by its own vacuity, unless a reaction in its favour sets in very quickly. I cannot understand why these halls of chemical science should be neglected. It is a problem, to resolve which no ordinary analytical power seems to be required. Given a town of this magnitude, say half a million of inhabitants, an association of two hundred and six members, a laboratory, library, and museum under one roof, and two professors ready to teach *con amore* on easy terms, how is it that the students number two? Verily,

"Parturiunt montes; nascetur ridiculus mus."

Is it because chemistry itself is underrated? Impossible, that the leading science of the day which touches nature at all points, whether air, earth, water, plant, or animal, should not be attractive. Is it that evening or general enjoyments are so numerous that time cannot be spared? This would be valid ground of excuse in many other cases, but in a study lying at the very root and basis of your profession, relative to which we may truly say "knowledge is power," both to understand, enjoy, and use that profession, then it is no excuse. It is suicidal indifference to your own evident interest, enjoyment, and profits. Is it that the cost in money is grudged? I will not insult this Association with an attempt to fight such a man of straw as this supposition. I will only say that were the cost many times increased, all who attentively study this noble science will, in their almost certain success, reap an incalculable gain, compared with which the prime cost will be lost like a drop in the ocean. I should like, indeed, to see this part of our Association placed upon a new and broader basis. I think it is capable of this, and the benefits accruing would be great and lasting. A liberal and comprehensive scheme would, I have no doubt, meet with a ready response from the various constituent classes of this Association. It will give me great pleasure to present, at the close of the session, two chemical prizes, of the value of a guinea and half-a-guinea, to the first and second best competitors of the Chemistry Class.

Passing on to another matter rather of explanation than of serious comment,—I mean the fact of there having been no "excursion" this year, or that our society has not, in fact, "gone out of town," hot as the summer has been,—I may say that this interruption to the annual sequence of these very pleasant trips has not arisen from any indifference of your Council to the gratification of the members, but chiefly from two causes—first, there were so many excursions set on foot, and, secondly, it is so extremely difficult to fix a spot to visit, which shall combine all the attractions of the country with others of a scientific character likely to interest our members.

One more remark on local topics shall end this review. It is respecting the attendance. I am grieved at the extent of wood which is often visible from this chair, and wish very much that members would try to hide the benches by occupying them through the coming session,—principals as well as juniors appearing,—so that our discussions may not be so frequently the reflex merely of one or two minds, but an approximation to the pharmaceutical opinion of the town, and the scene may prove less suggestive of a certain apothecary's shop, where—

"About his shelves
A beggarly account of empty boxes;
Green earthen pots, bladders, and musty seeds,
Remnants of packthread and old cakes of roses
Were thinly scattered to make up a show."

Passing now to more general topics, who can fail to be struck, on looking round attentively upon the world, with the amazing activity of mind displayed in every branch of human employment and thought. The spirit of enterprise and progress, greatly stimulated perhaps by the introduction of free trade, and fostered by the numerous industrial exhibitions in this and other countries, seems now at its height. We have only to consider the rapid strides which are being made in scientific discoveries, in industrial achievements, in art, in social improvement, in education, and in literature, to feel that our age is behind no former one. The influence of railways, electric telegraphs, steam-printing, presses and machinery generally, goes on advancing, augmenting the comforts and appliances of life, the power of man over the physical world, accelerating the diffusion of knowledge, and bringing not luxury alone to the rich, but by cheapening commodities, ameliorating the social condition of the masses, adding to their enjoyments and refining their tastes.

Never was there a time when so general and wide-spread an activity prevailed in all departments of human progress. An eloquent divine recently said, "We regard with fervent admiration those triumphs of the scientific intellect which will invest the last fifty years in the history of this country with splendour, different in kind from that which rests upon the Elizabethan age, but neither less lasting nor less glorious. We acknowledge that but for the scientific discoveries which the present generation has seen applied to the arts of life, the stability and grandeur of this country would be threatened with early decay, and all moral and religious interests which are involved in the prosperity and power of the English nation seriously imperilled. To us, the illustrious students of nature are ministers of God and benefactors of mankind. Without the rapture of inspiration, they are prophets who interpret to us the laws by which God orders his physical creation; they are priests, by whose service and mediation, rich and innumerable blessings, which it has ever been in the heart of God to grant, are actually obtained for the relief of human suffering, the increase of human happiness, and the general elevation and improvement of the condition of our race. As yet, these brilliant triumphs over the mysteries and powers of the physical universe are only just beginning, and, we seem to be on the very edge of great discoveries, the ultimate influence of which, on the thought and progress of mankind, it is impossible to anticipate."

Let us hope and believe that this wave of progress, as it swells across our time, will not leave us, the Pharmaceutists of the day, behind; but has already lifted and impelled us forward many degrees, and is still working powerfully to accomplish yet greater advances among us.

Descending to business matters, we might imitate a commercial circular, and say, that during the past year there has been a fair or even increased demand for physic. An evident tendency is shown to adopt a different style of prescribing, to countenance improvements, and study elegance and agreeableness and simplicity in the remedies ordered; while these are being augmented from time to time from foreign dispensatories or new discoveries. The series of phosphates and their preparations continue in as great favour as ever. Singular to say, an impression prevails that the syr. phosphatis compositæ of Parrish contains iron phosphate, which it does not, but lime, soda, and potash. Granular preparations multiply, and effervescent citrate of magnesia has gone mad. Liebig's food and ext. carnis seem likely to follow the example. The beautiful double salt of ammonio-citrate of bismuth is coming into use. Also the pure carbolic acid, which Mr. Davis introduced to us last session, has been much used, and, being perfectly soluble, forms, with rose-water, a most elegant antiseptic lotion. It has been suggested as a remedy for rinderpest. Cacao butter warrants the expectations entertained of it. I have used it considerably for pessaries and ointments; for the former, I can find no plan so good as casting them in a mould, made by rolling glazed writing-paper round a thin ruler, and fixing it with a little sealing-wax. The paper is detached with ease by breaking the seal.

The very successful use of the mineral acids, especially the nitric, for checking diarrhœa, is worthy of remark.

Magnesium wire, as a parlour novelty, is now exploded, and the favourite of the coming winter-season will, I suppose, be Pharaoh's Serpents, though the French Government seem afraid to sanction the introduction of the devouring element. Chemistry, Pharmacy, and Materia Medica have been well represented at the Dublin Exhibition; and, among the rest, some old acquaintances of our own, from Australia, appear in essential oils, gums, and barks. Of these, the sassafras bark and oil are much used as a medicine in the colonial hospitals.

At the time when I last addressed you, the Pharmaceutical world had not recovered from the excitement produced by the appearance of the long talked of British Pharmacopœia. Discussions were numerous, opinions conflicting, and the feelings resulting not always pleasant; but now that use for a considerable time has made us tolerably familiar with it, it seems, as Mr. Deane says, "that the difficulties are not so great as at first sight appeared." I wish I could think that the work was being universally followed; but as far as I can hear, in many places it is not. In the words of a correspondent, "the style of doing things is rather old-fashioned, the Brit. Pharm. being almost a dead letter." I need not point out, what you know so well, that prescriptions travelling from an old-fashioned to a new circle of pharmaceutists, or *vice versâ*, may become seriously changed in composition, as in tinct. aconiti, in liq. ammoniæ acetatis, liq. morphiæ, ung. præcip. alb., syr. sennæ, etc. But it is surprising to me that intelligent men should ignore the manifest improvements of the new *régime*, as in the infusions which are ordered variously to be made, some with cold, some with tepid, and some with boiling water, and generally to stand for shorter times, so as easily to be made extemporaneously without loss. The desirableness of adhering strictly to the prescribed forms, and not resorting to other methods, cannot, I think, be questioned.

Since the subsidence of this commotion, we have had a still greater on the matter of legislation. Hopes were entertained of our business being elevated and improved by an enactment which should confine the dispensing of prescriptions to examined men. Very great efforts were made by the Pharmaceutical Society, throughout the country, to secure the passing of such a measure, but for the present, as you know, with no satisfactory result. The principles of free trade have been thought to be in opposition to the desired restrictions in dispensing. And so the matter rests; and perhaps, as we say of railway accidents, until a score of directors are killed, no effective remedies will be found, so it may require some pharmaceutical catastrophe to cut off a few magnates, ere we can hope to find new views prevailing on the subject in influential quarters. One thing however remains, viz. much valuable evidence taken on the subject.

I cannot help remarking the spread of institutions like our own. They are beginning to appear in many of the large towns, and to mark, I hope, a new era in our history. Very little cohesion is generally thought to be possessed by our faternity, but rather that a repellent force drives its particles asunder. Cheering signs, however, are afforded that this state of things is fast vanishing, and more brotherly and cordial feelings taking its place. Union is strength, generally progress, certainly is happier than isolation or antagonism. No feature of present progress is more remarkable than the Pharmaceutical Conferences, the third of which has just been held at Birmingham. Elicited by that organization, the attention which is being paid to Pharmacy, and the advancement of our art generally, is very remarkable. If the establishment of the Pharmaceutical Society ushered in an epoch in our annals, the Conference does another, and before long we may hope to see its benefits felt widely throughout the kingdom. The pleasure of attending the late meeting in Birmingham, to those who had that privilege, must have been very great. I cannot refrain from pressing upon you the duty of attentively reading the opening address of the President, Mr. Henry Deane, because, as the editor of the Pharmaceutical Journal says, "like everything that emanates from Mr. Deane, it demands and will repay a careful perusal." Speaking of the social position of Pharmaceutical Chemists, he says, "The love of truth must not be confined to science, and pursued merely in the desire for gain, although we have an undoubted right to live by our labour, ingenuity, and skill, yet the idea associated with it must be extended to every relation of life. We must be reliable men, of unflinching integrity and honour, whose words must be our bond, and whose lives must accord with our profession; and, while resolved to be well paid for our labours and responsibilities, and while to meet the demands of an exacting public we must necessarily exert our ingenuity to devise *something new*, whereby we may avoid being left behind in the great struggle for existence, let us beware that we do not trench on other men's grounds or fields of action; let us strive to do unto others as we would have them to do unto us. There is no trade or calling, with which I am acquainted, that is so capable of a high development as that we are privileged to follow. Some of the greatest and most honoured men in Europe have been chemists and pharmaceutists, keeping open shop for the sale of their commodities and the dispensing of medicines. I allude to such men as Godfrey Hankwitz, Luke Howard, William Allen, and John Bell, in England; Pelletier, Guibourt, Fordas, and others, in France; Scheele, in Sweden, and in Germany a host of names, all of whom will be handed down to posterity, for generations to come, as benefactors to society and fit associates of princes. What these men have done, we also can, in some degree at least, emulate; and, by following earnestly such examples, do all that is needed to induce the world at large to accord to us the position we seek. But if, in an unhealthy and questionable competition, we strive to secure the largest share of trade to our individual selves, we shall degenerate into practices which will ever keep us both in fact and in public estimation deservedly in the ranks of mere hucksters." Papers were read on a great variety of subjects, and are published in the Pharm. Journ. for this month, forming a most interesting volume for perusal. So extensive are these articles, and so recently placed in our hands, that it is impossible to do more than allude to them as a whole. Very likely the gentlemen who represented us at the Conference, will have some remarks to make on the subject. The Conversazione, held on the Friday evening, comprised a company of about two hundred ladies and gentlemen. "Three sides of the great hall were occupied by long tables, in some parts two deep, loaded with articles chiefly of a character to interest chemists and druggists, yet a large number representing fine and industrial arts; a fourth, by a buffet on a liberal scale." The rooms were tastefully decorated with flowers, and, the Journal says, "altogether the Conversazione was of a most agreeable character; at intervals, short lectures occupying only a few minutes, were delivered, each alternating with a musical performance on a six-octave set of musical glasses of great purity of tone, by Mr. Bird and his son." Mr. J. Barclay read a report on the "Chemical Manufactures of Birmingham and its district," illustrated by samples, and Dr. Edwards lectured with experiments on "the Electric Discharge." Mr. H. S. Evans also exhibited a polariscope for determining the value of essential oils.

But it is time that I drew these remarks to a close, and perhaps I cannot do so more appropriately than by a few words to assistants and apprentices. It is very much to be feared that most young persons in the business form a very inadequate idea of what they ought to do. Their ideas, if any, are the most vague possible. Some probably think that the dreaded five years are to be spent principally hammering at the pestle and mortar, with refreshing intervals of bottle-dusting. Others go a little further, as described in the words of a letter I lately received from an applicant for office:—"Sir,—I beg to reply to your advertisement for an assistant. I am twenty years of age, and has had nearly five years and a half experience in making up of tinctures, pills, ointments, etc. I served a four years' apprenticeship in a first-class house in Glasgow, and have been eight months in my present situation. Should you think I would be suitable, I should expect a salary of £52 per *anum* (sic). Satisfactory testimonials will be forwarded if necessary." Rarely have I met with those who had pursued the attainment of theoretical and scientific knowledge side by side with practical every-day duties. And yet a moment's reflection should teach you the necessity of securing the former, or book-knowledge, as well as the latter. You must do the one, and not leave the other undone. You will otherwise become like too many assistants—pharmaceutical abortions; they have hands, but no head; a trunk and limbs, but no mind to direct and govern them. Mr. Brown's assiduity in study I never saw equalled. During the year and a half that he resided with me he obtained, in the intervals of business, and in time snatched from morning sleep, a fair knowledge of three languages, besides special subjects connected with the business, and got through also much other educational reading, so that he was able this summer to matriculate at the London University. His success proves that not great opportunities are required, but great diligence. Men who rise make their own opportunities, or at least they have so keen an eye for them that they take the prize while others sleep, or yawn, or play, never dreaming that golden opportunities were floating by. Books on your business, then, are to be your chosen companions, and they must be studied, not read merely, with method, perseverance, and application (for no quality makes up for the want of application) while your minds are elastic and impressible, and before the cares of responsibility, like your master's, come upon you; and, instead of looking outside for your pleasures, whether in novels, newspapers, or entertainments, try and find them in your profession. Hear Mr. Deane again, saying that "the honourable position he held amongst them on that occasion was largely due to a resolution he made on entering the drug trade, that it should afford him the chief source of his pleasures through life, and that by adhering to this rule so early laid down he now experienced the highest gratification in the approval of the Conference in his humble efforts to serve the cause he had undertaken." We cannot force you to this course. We can only advise,—you must elect your own course. You may, if you choose, try how not to learn your business, but in such a case I do not envy the feelings with which you will reflect on lost opportunities, and friendly influence and example despised.

Apologizing for having kept you so long, I must thank you for the patience you have accorded to my crude remarks.

LEEDS CHEMISTS' ASSOCIATION.

The Third Annual Meeting was held on the evening of October 11, 1865, in the library of the Philosophical Society,—the President, Mr. Haigh, in the chair.

The thanks of the Association were voted to the Council of the Pharmaceutical Society, to Messrs. Barron, Harvey and Co., and Messrs. Smith, Beck, and Beck, for contributions to the library. Messrs. Cordingley and Russell were elected Associates.

The Secretary, Mr. Yewdall, read the following Annual Report of the Committee.

In presenting the third Annual Report, the Committee refer with pleasure to the present position of the Society. During the past session, papers or lectures have been read as follows:—1864, October 19th, "Annual Meeting;" November 16th, "The President's Address;" November 16th, "On Liq. Ferri Perchlor., B.P.," by the Secretary; December 14th, "On Volumetric Analysis," by R. Parkinson, Ph.D., of Bradford. 1865. January 11th, "On Vitality, or the Correlation of Physical and Vital Phenomena," by Dr. Allbutt; February 8th, "Review of the Pharmacopœia of the United States," by Mr. E. Thompson; February 8th, "Microscopic Illustrations of the Alkaloids of Opium," by Mr. Rimmington, of Bradford; March 8th, "Microscopic Objects illustrated by the Oxycalcium Light," by Messrs. Abbott and Scorah; April 5th, "On Water," by Mr. Heathfield, F.R.G.S., of London.

Amongst these varied and interesting papers are contributions by gentlemen not immediately connected with our Society, an evidence of the interest taken in the progress of our Association by those favourable to such Institutions.

Through the kindness of the President and Council of the Philosophical Society, the Committee arranged to hold the monthly meetings in the library of the Philosophical Hall,—a boon much appreciated. The continued circulation of the books and periodicals proves the great utility of the library, to which has been added during the year the following valuable works:—Squire's 'Companion to the British Pharmacopœia,' 2nd edition; Barber's 'British and London Pharmacopœias Compared,' Haselden's 'Notes on the B. P.,' Church's 'Decompositions of the B. P.,' Fresenius's 'Qualitative Analysis,' Noad's 'Qualitative Analysis,' 'A Treatise on the Constitution, proper use, and capabilities of Smith, Beck, and Beck's Achromatic Microscopes;' together with the following periodicals, 'Pharmaceutical Journal,' 'Chemist and Druggist,' 'Technologist,' 'Intellectual Observer,' and 'Chemical News.'

The Committee regret that the session has passed over without any lectures upon Materia Medica, Pharmacy, or Botany. They are however prepared to arrange for the delivery of a course of lectures on any or all of these subjects, providing a sufficient number of Associates will express their readiness to attend.

The Committee requested Mr. Reynolds, F.C.S., and Mr. R. Parkinson, Ph.D., of Bradford, to represent this Association at the meeting of the British Pharmaceutical Conference, and they have pleasure in stating that these gentlemen kindly undertook the office, the former of whom has further promised an account of the doings of the Conference, which will no doubt prove interesting to our members.

Two Bills for regulating the qualifications of chemists and druggists were introduced into Parliament last year, and referred to a Select Committee, with a view to the introduction by Government, during the next session of Parliament, of an Act to meet the requirements of the public welfare. The evidence brought before the Select Committee, was strongly in favour of compulsory examination as a test of competency, and it is not superfluous to anticipate that in any legislative enactment having reference to the regulation of the trade, compulsory examination will be adopted.

It is obvious therefore that the Association deserves and should have the increased support of the trade as a means to an end whereby the Associates may obtain that information not always to be had in a private undertaking.

The Treasurer's account was then presented, and was as follows:—

Dr. BALANCE SHEET. *Cr.*

1864–5.	£. s. d.	1864–5.	£. s. d.
To Balance in hand	4 10 7	By Printing, Stationery, etc.	6 4 3
,, 33 Members' Subscriptions	16 10 0	,, Rent of Library	8 0 0
,, 37 Associates	4 12 6	,, Collector's Commission	1 0 0
		,, Lecture Room	1 5 0
		,, Gratuity to Porter	0 5 0
		,, Reprints from Pharmaceutical Journal	1 17 0
		,, 'Chemist and Druggist'	0 5 0
		,, Tanfield—Binding	0 15 0
		,, Postage	1 0 11
		,, Balance	5 0 11
	£25 13 1		£25 13 1

Examined and found correct.

J. BILBROUGH, J. C. REINHARDT, } *Auditors.*

The adoption of the Report and Treasurer's Account was moved by Mr. Atkinson, seconded by Mr. Smeeton, and carried.

The following officers were elected as the Committee for the ensuing year:—President, Mr. Haigh; Treasurer, Mr. Land; Secretary, Mr. Yewdall; Librarian, Mr. Thompson; Committee, Messrs. Reynolds, Smeeton, Stead, B. Taylor, S. Taylor, and Ward; Auditors, Messrs. Bilbrough and Reinhardt.

The thanks of the meeting were offered to the retiring officers.

Mr. Reynolds, F.C.S., then gave a *résumé* of the proceedings of the British Pharmaceutical Conference at Birmingham, with illustrations of some of the papers. A general discussion followed.

ORIGINAL AND EXTRACTED ARTICLES.

SUPPLEMENT TO PAPER ON AN ANTIDOTE AT ONCE FOR PRUSSIC ACID, ANTIMONY, AND ARSENIC.

BY MESSRS. T. AND H. SMITH.

In addition to and completion of our late remarks, in this Journal, on Sol. Ferri Perchloridi as an antidotal agent in poisoning by either prussic acid, antimony, or arsenic, it occurred to us, while our manuscript was in the compositors' hands, that the question may be asked—what effect would the not unlikely occurrence of free acid in the stomach have on the action of the prussic acid antidote when its use may be indicated? If the amount of acid could be known, the answer would be easy, viz. the corresponding quantity of an alkali given in advance would prevent any interference with the desired action; but a quantity of alkali so great would be required to meet the most extreme case that the remedy might itself have an injurious action, or might form a soluble yellow prussiate which, although not poisonous, would be a less desirable product than the insoluble and inert Prussian blue. It therefore suggested itself to our minds that caustic magnesia might be a more desirable agent in such a case. A single trial showed that every difficulty is removed by the use of that substance, and that it does not interfere with the action of the antidote.

Ninety grains of calcined magnesia were made into a smooth cream with a little water; two drachms of muriatic acid were then added, and the acid was instantly neutralized, yet leaving a large excess of magnesia. 100 minims of medicinal prussic acid were now added, and on now preparing to add the alkaline solution to form a cyanide, before the addition of the iron solution, it occurred to us that the excess of magnesia itself might form the cyanide necessary to the formation of the Prussian blue. Resolving, therefore, to put the idea to the test, we at once added the iron solution, and the moment contact between the two liquids occurred the blue colour showed that the formation of Prussian blue had, to a certain extent, been the result. After the addition of a solution containing 11½ minims of solution of perchloride of iron, and 8¾ grains of green vitriol, muriatic acid was added till the excess of magnesia and the excess of proto-peroxide of iron had been dissolved. Prussian blue was left in abundance. On now at once filtering, and adding to the filtered liquid a few drops of a solution of persalt of iron, no Prussian blue was formed,* showing the absence of any ferro-prussiate. On now adding aqua potassæ to neutralize the excess of acid and throw down the iron in solution, no tinge of blue was produced, not even on adding an excess of dilute muriatic acid. The precipitate entirely dissolved to a clear solution. The complete absence of prussic acid was thus proved. All of it had been completely removed.

We prepared as above another quantity of magnesia emulsion mixed with prussic acid, and, after adding the iron solution, the liquid, having been filtered from the mixture, was without delay distilled, and on testing the distillate, it neither answered to the Prussian blue nor to the silver test; it contained no prussic acid.

We believe ourselves justified in now giving, as the antidote for prussic acid, magnesia and a proto-persalt of iron, thus :—Make into a smooth cream, with water, from 1 to 2 drachms of calcined magnesia. Give the emulsion to the patient, then give, in water, a solution of 16 minims of perchloride of iron, and 12½ grains of green vitriol. These numbers, being in excess of the theoretical quantity, were those used in our experiments. Should it be supposed that so much as 400 minims medicinal prussic acid had been taken, of course four times the quantity of the iron compound necessary for 100 minims should be given, but without altering the quantity of magnesia.

Although calcined magnesia, *alone*, slowly dissolves in prussic acid, yet in the presence, simultaneously, of a large excess of magnesia and the solution of a proto-persalt of iron, the reciprocal action resulting in the formation of a Prussian blue seems to be almost instantaneous.

ADULTERATION OF OLIVE OIL.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—When bringing the subject of cotton-seed oil before the British Pharmaceutical Conference last month, I did not anticipate having so good an illus-

* When freshly-precipitated Prussian blue is rubbed up with calcined magnesia in considerable excess, after a short time, the mixture having been collected upon a filter and washed with distilled water, it will be found that almost all the Prussian blue has been converted into proto-peroxide of iron, along with a simultaneous corresponding formation of ferrocyanide of magnesium, as may be proved by the addition of a solution of a persalt of iron to the filtered liquid, whereby almost all the Prussian blue is reproduced. This reaction does not take place when an excess both of magnesia and of the iron solution is used, as in the case of the antidote; for, if the mixture of Prussian blue, proto-peroxide of iron, and magnesia thus obtained be digested for a long time with water, and that at the temperature of the living body, barely a trace of Prussian blue is produced upon the application of a solution of persalt of iron to the filtrate. In this case the excess of iron in the form of precipitated oxide, along with the Prussian blue, appears to prevent the Prussian blue from being decomposed by the magnesia, as would occur with this substance by itself. Two explanations of this remarkable result suggest themselves: either a compound, stable towards magnesia, may be formed between the Prussian blue and the proto-peroxide of iron, or this last substance by enveloping, and thus shielding the Prussian blue from the action of the magnesia, may prevent the result that would otherwise be produced.

tration of its abuse as is furnished by the following extract from the 'Hull News' of the 14th instant. The line of defence seems to have been an attempt to prove that the mixture of cotton-seed oil with olive oil was the rule rather than the exception, and we may anticipate that the formality of giving the former a trip to Italy will soon be dispensed with. Having within a few days had a sample of "olive oil" sent for analysis from the manufacturing town of Batley, and finding that, beyond an odour of olive oil, its physical and chemical qualities were altogether those of cotton-seed oil, I am sure that the fraud is but too common.

Yours, etc.,
R. Reynolds

Leeds, October 19, 1865.

The Adulteration of Olive Oil.—*Crowther* v. *Messrs. Tall.*—Claim £100.—Mr. F. F. Ayre for the plaintiff, a cloth manufacturer at Pudsey; and Mr. Bruce, barrister-at-law (instructed by Mr. Leak) for the defendants, who are oil merchants at Hull.—The amount sought to be recovered by this action was £100 damages, sustained by reason of the defendants supplying oil which should have been olive oil, but which the plaintiff alleged was not. Mr. Ayre stated that in the manufacture of woollen cloth it was necessary to use a large quantity of oil, for the purpose of rendering the fibres smooth. In December, or in the early part of January, 1864, the plaintiff was in Hull, and accompanied a Mr. Goddard to the office of the defendants. Mr. Goddard was there appointed agent to the defendants for the sale of this particular class of oil. Several samples were produced in the office, and amongst others one called "Olive Oil No. 3." Subsequently the plaintiff again called upon Mr. Goddard with an order for a quantity of oil, which was afterwards supplied by the defendants. That oil proved to be perfectly good, and equal in quality to the sample. In consequence of its being so good, in February following plaintiff gave a second order for one tun of the oil. The plaintiff on this occasion went to the agent, and, taking hold of the sample bottle, ordered a tun "of the same oil." A day or two afterwards the oil was delivered, and it proved to be so bad that six packs of wool, valued at £40 each, or thereabouts, were spoiled. In attempting to weave the yarn it was found that the oil, instead of making the fibres smooth, had had the contrary effect. The actual loss sustained by the plaintiff was £300, but this action was brought, for the purpose of economy to both parties, for £100. The plaintiff was cross-examined by Mr. Bruce as to the items of loss sustained through the badness of the oil. He said that he was unable to fulfil the terms of a contract by which he was bound to deliver a large quantity of cloth by a certain date, and moreover he had had to pay a considerably-increased rate of wages in order to get the damaged wool worked up.—Mr. Goddard, in giving evidence for the plaintiff, stated that in consequence of communications from the defendants he came to Hull, and there saw Mr. George Tall, who said with respect to the oil complained of, "It is no use mincing the matter, it was adulterated with cotton-seed oil." Mr. Bruce submitted that at the time the oil was sold Mr. Goddard was not the agent of the defendants, and, further, that there was no proof that the oil which had caused the injury was the same as supplied by Mr. Goddard to the plaintiff.—For the defence Messrs. Frederick and George Tall were called, and examined at great length as to the period at which Mr. Goddard's agency terminated. In answer to questions from Mr. Ayre, Mr. Frederick Tall deposed that the oil sold to the plaintiff as "Olive Oil No. 3" was a compound, one of the ingredients of which was cotton-seed oil. They frequently shipped hundreds of tuns of cotton-seed oil to Italy, where, as there were no soap makers, and as olive oil was exported from thence, they could form their own inference for what the inferior oil was used. It was also stated that olive oil was commonly adulterated with cotton-seed oil.—At the close of the evidence his Honour intimated to the parties to the action that they had better agree among themselves as to the amount to be paid to the plaintiff, and on this understanding a conference took place between the attorneys on each side, Mr. Ayre ultimately announcing that an arrangement had been made, the terms of which would be definitely settled this day.

Note.—It is only fair to add that the following has since appeared:—

To the Editors of the 'Leeds Mercury.'

Gentlemen,—A cutting from your paper of Saturday, headed "What is olive oil?' has been handed me from your neighbourhood, asking for an explanation as to the correctness of a statement of the defendant in an action in our County Court against him for mixing olive oil with cotton-seed oil, viz. that "he had shipped hundreds of tuns of cotton-seed oil to Italy." This is a mistake, as he is simply an oil refiner, and not an exporter or shipper. He had sold the oil for export to Trieste, which, he afterwards said, he thought was in Italy.

It is a fact that cotton-seed oil is refused admittance into Italy. The inhabitants consume and eat large quantities of olive oil. Besides, the Italian Government are too fully alive to the importance of maintaining the purity of an article of such vital importance to their commerce, to suffer the slightest attempt at trickery with one of their staple articles well known to all the world.

I am, Gentlemen, yours obediently,

JOHN SMITH, *Consular Delegate.*

Italian Consular Delegation, Kingston-upon-Hull,
18*th October*, 1865.

Of course, no attempt is made to upset the admission that the oil was adulterated, and this is the essential fact to the consumer.

R. R.

ON THE DETECTION OF METHYLIC ALCOHOL WHEN MIXED WITH RECTIFIED SPIRIT OF WINE, AND OF DISTINGUISHING BETWEEN ETHER AND SWEET SPIRIT OF NITRE WHEN PREPARED FROM PURE AND FROM METHYLATED SPIRIT RESPECTIVELY.

BY MR. W. YOUNG.

Aware of the great interest taken at the present moment in the above subject, I thought a few remarks, on a method I have adopted for some time for detecting the presence of methylated spirit, might prove acceptable to your readers; especially as not much time or trouble are involved in its application.

The evidence of the presence of methylated spirit in, or having been used in the preparation of, the above articles, is based on the change produced by it in the colour of the solution of permanganate of potash.

The solution I use, and which, in what follows, will be spoken of as "the test," is made by dissolving 1 grain of crystallized permanganate of potash in 1 fluid ounce of distilled water.

Spirit of Wine.—1. If 10 minims of the test be added to 4 fluid drachms of the purest rectified spirit in a test tube, the mixture will be found to retain the bright pinkish colour so characteristic of permanganate of potash, for at least ten minutes, when it gradually fades. As regards colour, this may be taken as a standard for comparison.

2. Add 10 minims of the test to 4 fluid drachms of the same spirit, previously mixed with 2 per cent. of wood naphtha. The difference between this and the pure spirit is at once apparent. The liquid no longer retains its characteristic colour, but almost instantly changes to a dull pale-brown tint.

3. Add 10 minims of the test to 4 fluid drachms of pure spirit, previously mixed with 10 per cent. of wood naphtha, as in methylated spirit. Here the change in the colour of the test is even more striking, the liquid at once assuming the brown tint, as in experiment 2, only in a greater degree.

So great is the delicacy of the test, that 1 part of wood spirit in 300 of rectified spirit of wine may be readily detected by its aid; but I imagine it will be mostly valued in the next application I shall speak of, viz. to sulphuric ether, as no ready method has been published for distinguishing the pure from that containing 10 per cent. of oxide of methyl, prepared from methylated spirit. The pure ether, used in the following experiment, was Howard's make.

Sulphuric Ether.—Take two clean dry test tubes, put 4 fluid drachms of pure ether into one, and the same quantity of methylated ether into the other; place side by side, and add to each 10 minims of the test, mixed immediately before use, with 50 minims of pure rectified spirit, to render it more readily miscible with the ether. The pure ether will retain the pinkish hue, imparted to it by the test, for a considerable time; whilst that made from methylated spirit changes to a pale brown in a minute or so. By adding successive portions of the test, the same effects will be observed, as the oxide of methyl appears to possess the property of decolorizing a considerable quantity of the test.

Sweet Spirit of Nitre.—Previous to applying the test to this spirit, either pure or methylated, I proceed in the way described by Mr. Tuck, on page 173 of the Pharmaceutical Journal for October; best described in his own words, "Mix the sweet nitre with an equal bulk of solution of caustic potash, twice the strength of the Pharmacopœia solution, and, after allowing the mixture to stand about an hour, distil off an amount of spirit equal to the quantity employed."

On proceeding, as in the former experiments, a most marked difference will be perceived, on the addition of the test, between the pure sweet nitre and the methylated, the former retaining, the latter soon losing its colour.

116, *Balls Pond Road, N.*

THE NEW EDITION OF THE PHARMACOPŒIA.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—The President of the Pharmaceutical Conference, in his able address at Birmingham, states that,—"Judging from the little that is now heard of the subject (the British Pharmacopœia), one can but arrive at the conclusion, either the new regulations laid down are widely ignored, or that chemists, wholesale and retail, are gradually falling in with them. I hope it is the latter." I would I could hope the same. I think there has been a great amount of hypercriticism upon it, from which cause many medical men have never studied it, at least many daily betray their ignorance of it by writing P. L. on every prescription, whether it would be affected by it or not. Oftentimes prescriptions are marked P.L., when officinal formulæ for some of the ingredients are only to be found in P.B., such as *Ferri et Quiniæ Citras*, *Acidum Nitro-hydrochloricum dilutum* (this was not officinal in any British Pharmacopœia previous to P.B.), and *Extractum Colocynthidis compositum*, which was not in the last P.L. Dr. Garrod's table "of the alterations in strength of preparations of sufficient importance to render them *essential* to be borne in mind in prescribing," contains only twenty-four articles; no great bugbear this, one would think. Besides this, it must often lead to great disappointment in their practice, as frequently prescriptions containing *Tinctura Aconiti* or *Tinctura Nucis-Vomicæ* are not marked either P.L. or P.B., although, from the tenor of the prescription, it may be seen that P.L. is intended; yet in such cases, where they are for internal administration, by erring on the side of caution, the weaker (P.B.) preparation is almost invariably used. Seeing that the whole work is undergoing revision by able editors, I hope it may not be presumptuous in me to offer one or two suggestions.

Why is *Tinctura Conii Fructus* so called? Is it intended that the tincture of the leaves is to be used unless it be written as above? If so, why have they not given us a formula for it? Would it not have been better to have made it as near the same strength as the tincture of the leaves, instead of double it, as Dr. Garrod states it is, so that the affix *Fructus* might have been dropped; and it could have been used in place of the tincture of the leaves without danger? Is there any need of having two tinctures of this plant? That of the fruit, I have no doubt, is much more uniform in strength.

The Galenical preparations of iodine are in a muddle at present, what with the wide difference in strength and the nomenclature applied to the tinctures in the four Pharmacopœias. *En passant*, let us call a spade, a spade, and let compound tinctures be called such. Why should *Tinctura Iodi* be so called, and the *ointment*, *Unguentum Iodi compositum*. A glycemate of iodine, I think, would be a better preparation than the liniment, seeing the change this undergoes. Such a preparation is sometimes prescribed by German physicians. As glycerine seems to be a favourite of Dr. Redwood's, I think it would be a valuable addition to many pill-masses. The Skin Hospital Pharmacopœia contains it in nearly every formula for these. It keeps them plastic and moist; in fact, this latter is a fault it has, as it oozes out of the pills when moulded if added in excess, but when in *excess* only.

A farmer once asked, at an agricultural show dinner, what had become of the "short-horns," which are the pride of an English farmer, there having been such a poor show of them. Might I not ask what has become of the pill-masses? Where is *Pilula Ferri composita* and *Pilula Galbani composita?* They are frequently prescribed. It may be said that they are represented by *Pilula Ferri Carbonatis* and *Pilula Assafœtida composita*, but this is like *Tinctura Quiniæ composita* representing *Decoctum Cinchonæ flavæ*. No preparation should be discarded from the Pharmacopœia which is in daily use.

What need was there of increasing the strength of mucilage? Surely the P.L. was thick enough to measure conveniently. The P.B. gets bad before it is made, in hot weather.

A formula is much needed for *Mistura Sennæ composita*. This is daily prescribed, and the vile compounds (though not a pleasant one under any circumstance) that represent it are disgraceful. The formula for it of one master with whom I lived contained no less than thirteen articles. What virtue was obtained from the scammony and jalap in it I could never make out.

The change in *Liquor Ammoniæ Acetatis*, I think, was needed. The P.B. preparation is much more stable than the P.L. I doubt the hypothetical action which Dr. Redwood ascribes to it when made with distilled vinegar or dilute acetic acid, so as to contain some carbonic acid. According to P.L., it is generally made in the concentrated form, and thus contains but little.

I am sorry to learn Dr. Redwood is much opposed to the metrical system of weights and measures. I have been told by two English dispensers who have had considerable experience in Paris, that for dispensing it answers admirably. I should like to have seen Mr. Squire's suggestion carried out, to have the formulæ represented by both systems, the quantities by each in separate columns, now that the metrical system is permitted by law.

Although I cannot "come it" quite so classic or poetical as Mr. Haselden, still I should like to see the Pharmacopœia in Latin, as it could then be read the world over by those for whom it is designed.

I have already encroached too much on your space. I hope to see, in the new edition, some of the difficulties removed that beset the path of

A DISPENSER.

London, September 23, 1865.

ON THE PRESENT STATE OF THE CHEMISTRY OF GAS-LIGHTING.

BY HENRY LETHEBY, ESQ., M.B., ETC.

Delivered at Birmingham before the Society of Gas Engineers.

Gentlemen,—I propose that we should continue to-night our inquiries into the chemistry of gas-lighting—that, in fact, we should extend our investigation into the subject which was commenced at the meetings of this Association last year at Manchester, when, as some of you will remember, I directed your attention to the chemical principles involved in the manufacture and purification of coal gas. On the present occasion we will examine the leading physical, chemical, and photometrical properties of the most important constituents of coal gas.

Briefly to recapitulate the subjects of the last lecture, I may remind you that we inquired, in the first place, into the composition and probable origin of the material out of which gas is produced—coal; that we then examined the leading constituents of the several varieties of coal which are best suited for the manufacture of gas, especially directing attention to the form in which the most objectionable impurity (sulphur) of coal existed. We also considered the phenomena of carbonization or distillation of coal, and saw how much it was influenced by temperature, and how, under the influence of heat, the elements moved from their old states of combination into new.

We then discussed the composition of raw gas as it leaves the retort, and I pointed out to you that it consists of the constituents marked in the following table:—

Constituents of Raw Gas.

Tar matter.
Aqueous vapour.
Carbonic acid.
Ammonia.
Cyanogen.
Sulpho-cyanogen.
Sulphuretted hydrogen.
Bisulphide of carbon.
Sulpho-hydrocarbons.
Nitrogen.
Oxygen.

Hydrogen.
Light carburetted hydrogen.
Carbonic oxide.
Condensable hydrocarbons.

Now the whole of these constituents above the line may be regarded as impurities, and I pointed out to you that the taking of these impurities out of coal gas, in order to effect the perfect removal of them, involved a proper order, as it were, of purification—that, in the first place, both science and practice pointed to the fact that the condensation or cooling of the gas should not be too sudden; that the longer the gas was kept in contact with tar and ammoniacal liquor before it went to the condensers the better. It had been seen in numerous instances that a long hydraulic main, extending a considerable distance from the retorts, always effected the condensation of naphthaline as well as objectionable sulphur-compounds; and I further pointed to the fact that when the gas has traversed the condensers it was never fairly purified if it left them at a higher temperature than 60° Fahr. The aim, in fact, should be slow but complete condensation by gradual cooling, for if the temperature of the gas exceeded 60° the ammoniacal liquor was never of its full strength, and much sulphur, ammonia, carbonic acid, and aqueous vapour passed on to the purifiers, where such impurities were seriously in the way.

The next question is how to remove from the gas the sulphuretted hydrogen, the ammonia, and the other impurities which still remain in it. In continuation of the system already adverted to, it is well to submit the gas to the action of a copious stream of ammoniacal liquor after it leaves the purifiers. As far back as the year 1846 Mr. Lowe directed attention to this, and he patented a process for effecting it. Very recently Mr. Hawksley has, from independent observations, and from a chemical consideration of the subject, recommended a like process.* He advises that the gas should be drenched with ammoniacal liquor to the extent of a sixteenth of the volume of the gas. The effect of this is to strengthen the liquor and to remove from the gas ammonia, sulphuretted hydrogen, carbonic acid, and the objectionable compounds of sulphur with carbon, and the hydrocarbons. In practice it is found that the gas thus treated never contains more than twelve grains of sulphur in any form in 100 cubic feet—the average being about nine grains and a half; and, to use the words of your president, "it thus appears that all considerable gas companies may, by a very simple, and in other respects very useful process, remove a large proportion of the objectionable sulphur compounds which usually continue to exist in coal gas after it has been passed through lime or other metallic oxide."

The residual impurities—namely, the ammonia, sulphuretted hydrogen, and carbonic acid—are next to be removed in proper order. Washing the gas with water, or with weak ammoniacal liquor, and finally with water, will at once abstract a considerable amount of all these impurities; and although there is a prejudice with some engineers that this kind of purification is objectionable on account of its lowering the illuminating power of gas, yet, as we shall see hereafter, the prejudice is not founded on fact—excepting that the process undoubtedly removes such compounds as tar and naphthaline, which, though of high illuminating power, are nevertheless better out of the gas than in it, seeing how much mischief they do by subsequent deposition in the mains and service-pipes. You will have an opportunity of seeing at the Saltley station of the Birmingham and Staffordshire Gas Company, in this town, the good effect of thoroughly washing the gas with water or weak ammoniacal liquor before it passes to the purifiers. Mr. Young, the experienced engineer of the company, has for some time past adopted this practice. The gas, on leaving the condensers, traverses successively three washers, or, as they may be more properly called, douche scrubbers; each of them is 25 feet high, 8 feet long, and 4 feet wide; and the liquor or water is delivered into them at the rate of 1815 gallons an hour, the gas passing at the rate of about 66,000 cubic feet an hour. The water or liquor flows through a pipe or jet with a very small orifice, and, dashing upon a disk immediately below it, is splashed out into a fine shower which meets the ascending gas. The rate of flow therefore is about 27½ gallons for every 1000 cubic feet of gas. In this manner the gas is thoroughly cleansed before it goes to the purifiers, and the contrivance is such that no pressure is put upon the gas, for it passes through washers without friction. The quantity of ammoniacal liquor which is thus obtained amounts to 44 gallons per ton of Staveley coal, the strength of the liquor being 4 of Twaddle, or about 8 ounces of sulphuric acid. Before this process was adopted, the quantity of liquor of the same strength was only 25 gallons per ton; and the profit arising from the sale of the liquor is more than £2000 per annum in excess of the former returns. I find from an examination of the gas that its illuminating power is from 15 to 16 sperm candles of standard quality, and that there is no loss of power by deposition in the mains—the gas, indeed, is absolutely free from ammonia, naphthaline, and carbonic acid, and the amount of sulphur in any form does not exceed 16 grains per 100 cubic feet. When the gas has been thus washed it contains but little ammonia, so that a tray of acid sawdust in the purifier remains for months without being saturated. After this complete removal of ammonia the gas should be submitted to the action of wet lime, or, failing this, on sanitary grounds, to oxide of iron; and, lastly, to a few trays of dry lime to remove carbonic acid, which, as I shall show you directly, is a very objectionable constituent of gas, on account of its lowering the illuminating power.

The order, then, of purification is:—1st, slow but complete cooling; 2nd, washing with ammoniacal liquor; 3rd, the removal of ammonia by water or acid; 4th, the abstraction of sulphuretted hydrogen by lime or oxide of iron; and 5th, carbonic acid. I have been particular in recapitulating all this, because of its great importance in the manufacture of good gas.

We will now pass on to the proper subject of the lecture, namely, the examination of the chief constituents of purified coal gas. These may be classed under three heads:—

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* 'Journal of Gas Lighting,' vol. xiii. p. 542.

1. The combustible non-illuminating constituents.
2. The illuminating hydrocarbons.
3. The impurities.

1. *The Combustible Non-Illuminating Constituents of Coal Gas.*

These form a very large proportion of its bulk—as from 30 to nearly 60 per cent. They are hydrogen and carbonic oxide; and their sole function seems to be the purveying or carrying the illuminating hydrocarbons.

(a) HYDROGEN (H) exists in coal gas to the extent of from 12 to nearly 50 per cent. It is in greatest abundance in poor gas of low illuminating power, and it no doubt comes in great part from the decomposition of the richer hydrocarbons by the high temperature of the retorts. It is also produced by the moisture of the coal giving up its oxygen to the red-hot carbon, and setting free its hydrogen. The gas is singularly inert —it has no colour, no taste, no odour, and no action on the human body. It is the lightest body known, its specific gravity being 0·0692, atmospheric air being 1; and 100 cubic inches of it weigh only 2·15 grains, the same quantity of air weighing 31 grains. It burns without any light; and, as you perceive when I hold a cold glass over the flame, the product of its combustion is water. One cubic foot of hydrogen requires half a cubic foot of oxygen, or 2½ cubic feet of atmospheric air, for combustion. The temperature of the flame is very high, about 5898° Fahr.; and a cubic foot of the gas, in burning, will raise 5220 ounces of water, or 16,250 cubic feet of air, 1° Fahr. Lastly, it is but slightly absorbed by water—100 volumes of water taking up about 1·93 of hydrogen gas, and it is not condensable by cold or pressure.

(b) CARBONIC OXIDE (CO) is a compound of one proportion of carbon and one of oxygen. By weight, therefore, it consists of 6 parts of carbon and 8 of oxygen; and by volume, of half a volume of carbon vapour and half a volume of oxygen, united without any condensation. It is not a large constituent of coal gas, the proportions ranging from about 5 to 16 per cent.; but it forms a considerable part—about 34 per cent.—of the gas made by the decomposition of steam by red-hot carbon. This, indeed, is the chief source of it in common coal gas. Like hydrogen, it is colourless and odourless; but, unlike it, it is a deadly poison. I have ascertained that 2 per cent. of it in air will kill birds almost instantly; and, according to Leblanc and Dumas, an atmosphere containing 1 per cent. of it will kill a small dog in a minute and a half. It is a little lighter than atmospheric air in the proportion of 0·967 to 1; and 100 cubic inches of it weigh nearly 30 grains. It burns with a pale bluish and somewhat opaque flame; and, as you here see, it forms nothing but carbonic acid. The flame cannot be got from the small jet over the governor. I am obliged to burn the gas from a very large jet over the pneumatic trough, and therefore I am not able to show you the size of its flame in comparison with coal gas. In the act of burning, 1 cubic foot of carbonic oxide consumes half a cubic foot of oxygen, or 2½ cubic feet of air; and the heat of the flame is very nearly as great as that of hydrogen, it being 5508° Fahr. A cubic foot of it will raise the temperature of 5400 ounces of water, or 16,500 cubic feet of air, 1° Fahr. It is but slightly absorbed by water—100 volumes absorbing 2·43 volumes—but it is very freely absorbed by a strong solution of subchloride of copper; and this is the agent used for its detection in coal gas.

2. *The Illuminating Constituents (Hydrocarbons) of Coal Gas.*

These are all compounds of carbon and hydrogen; hence their name, hydrocarbons. And as, in the same volume of the gas, there are very different proportions of carbon, the illuminating power of these several constituents varies considerably. In all cases the light which they evolve in the act of burning is due to their decomposition by the heat of the flame, and to the suspension of the liberated carbon for a definite time in an ignited state.

The following are the principal members of this group, beginning with the least illuminating:—

Marsh Gas, C_2H_4; Olefiant Gas, or Ethylene, C_4H_4; Propylene, C_6H_6; Butylene, C_8H_8; Acetylene, C_4H_2; Benzol, $C_{12}H_6$; Naphthaline, $C_{20}H_8$, and perhaps some others.

(a) MARSH GAS is also called Pit Gas, Fire-damp, Light Carburetted Hydrogen, and Hydride of Methyl (C_2H_4). A volume of the gas contains half a volume of carbon vapour, and two volumes of hydrogen. It is a large constituent of the gas evolved from sewage, and the mud of a stagnant pool. It also forms from 79 to 91 per cent. of the fire-damp of coal mines, and it constitutes from 30 to 60 per cent. of coal gas. It is colourless, odourless, tasteless, and without action on the animal body, for miners breathe it with impunity. It is a little more than half the weight of atmospheric air, its specific gravity being 0·5531; and therefore 100 cubic inches of the gas weigh 17·15 grains. It burns, as you perceive, with a pale yellow flame, which is bluish for a considerable distance up, the height of the jet being somewhat less than that of coal gas, and so also is its illuminating power. A cubic foot of gas consumes 2 cubic feet of oxygen, or 10 cubic feet of air; and the products of the combustion are a cubic foot of carbonic acid, and aqueous vapour. The heat of the flame is about 5890° Fahr., and a cubic foot will raise 16,920 ounces of water, or 52,000 cubic feet of air, 1° Fahr. The gas is but slightly absorbed by water, 100 volumes taking up 3·91 of the gas. It is not absorbed by chlorine, except after some time, and in the light; nor by bromine or fuming sulphuric acid; and it is not easily decomposed by heat, nor is it condensed by cold. There is no immediate test for the gas.

Besides marsh gas, there are probably other members of the series present in coal gas, as Ethyl-hydride (C_4H_6), Propyl-hydride (C_6H_8), Butyl-hydride (C_8H_{10}), and Amyl-hydride ($C_{10}H_{12}$), all of which are found in the petroleums of commerce.

(b) Olefiant Gas, Ethylene, or Elayl (C_4H_4), is a gas which contains twice as much carbon in a given volume as the last—a volume of it contains its own bulk of carbon vapour and two volumes of hydrogen. It exists in fire-damp to the extent of from 2 to 16 per cent., and in coal gas too from 8 to 27 per cent., cannel gas containing it in the largest proportion. It is colourless, and, when pure, is a little ethereal or sweetish in its odour, and is anæsthetic or stupefying in its action on the body when it is inhaled. It is very nearly as heavy as atmospheric air—its gravity being 0·967; and therefore 100 cubic inches of it weigh nearly 30 grains. It burns with a long, bright yellow flame, the illuminating power of which is fully twice as great as the last. A cubic foot of the gas requires 3 cubic feet of oxygen or 15 cubic feet of air for its combustion, and it produces 2 cubic feet of carbonic acid, and much aqueous vapour, evolving about one-third more heat than the last. When mixed with twice its volume of chlorine gas and fired, its hydrogen is consumed, and its carbon is deposited in the form of soot. It is also slowly absorbed by chlorine, in the dark as well as in the light, forming a heavy oily liquid of an ethereal odour, called Dutch liquid ($C_4H_4Cl_2$). In like manner it is absorbed by bromine, and by fuming sulphuric acid, The gas is slightly soluble in water, to the extent of about one-eighth of its volume, and it is freely soluble in alcohol, ether, volatile oil, and fixed oil. Turpentine, for example, will take up twice and a half times its volume of the gas, and olive oil will absorb its own volume of it. It is easily decomposed by heat—a red-heat converting it into carbon and marsh gas, together with a small quantity of tarry matter; and the gas is condensable by great cold and by pressure. The test for the gas is bromine or fuming sulphuric acid, which freely absorb it.

(c) Propylene, or, as it is sometimes termed, Tritylene (C_6H_6), is a compound of carbon and hydrogen in the same percentage proportions by weight as the last; but a volume of it contains $1\frac{1}{2}$ volume of carbon vapour and 3 volumes of hydrogen. Its proportion in coal gas has not been accurately determined. It is colourless, and has a stupefying action on the body. It is just half as heavy again as atmospheric air, its specific gravity being 1·455; and therefore 100 cubic inches of it weigh about 45 grains. It burns with a bright yellow and somewhat sooty flame, which is fully three times as long as the comparison jet of coal gas burning from the same-sized orifice and under the same pressure; and the light evolved from it is about three times as great as that from common coal-gas. A cubic foot of it requires $4\frac{1}{2}$ cubic feet of oxygen, or $22\frac{1}{2}$ cubic feet of air, to burn it; and it produces 3 cubic feet of carbonic acid, and much aqueous vapour. The heat evolved by it is also very great. It is but slightly absorbed by water, but it is freely absorbed by chlorine, bromine, and iodine, forming compounds which correspond to Dutch liquid. It is also absorbed by fuming sulphuric acid, and even by strong oil of vitriol. The volatile and fixed oils dissolve it, and so also does a solution of protochloride of copper. As in the last case, it is readily decomposed by a red-heat, forming marsh gas, and depositing carbon; and it is also condensed by cold and pressure.

(d) Butylene, Tetrylene, Ditetryl, or Oil Gas (C_8H_8), is a still further condensation of carbon and hydrogen in the same percentage weights as in olefiant gas. A volume of butylene contains two volumes of carbon vapour and four of hydrogen. It is a large constituent of oil gas, and it exists in cannel gas to the extent of about from 3 to 4 per cent. Common gas contains it in very small proportions. The gas is colourless, and it has a peculiar odour. Its action on the body is not known, but no doubt it is anæsthetic, like the other hydrocarbons of this series. It is nearly twice as heavy as atmospheric air, its gravity being 1·935; and therefore 100 cubic inches weigh just 60 grains. It burns, as you perceive, with a long sooty flame, the jet being nearly four times as long as the comparison jet of coal gas; and the illuminating power of it is about four times as great as the jet of common gas. A cubic foot of the gas requires 6 cubic feet of oxygen, or 30 cubic feet of air, to burn; and the products of its combustion are 4 cubic feet of carbonic acid and much aqueous vapour. Like the other hydrocarbons, it is but slightly soluble in water, but it is freely dissolved by alcohol and by the fixed and volatile oils; olive oil, for example, absorbs about six times its volume of the gas. It is also absorbed by chlorine and bromine, forming compounds analogous to Dutch liquid; and it is likewise freely absorbed by sulphuric acid, a volume of the acid taking up 100 volumes of the gas. If it is passed through a red-hot tube, it is decomposed and resolved into marsh gas, hydrogen, and carbon. It is also easily condensed by cold and pressure, forming a thin, transparent, and colourless oil, of which I show you a specimen. In the days of oil gas, when the Compressed Gas Company was in existence, this ethereal oil was produced in rather large quantity; 1000 cubic feet of the gas submitted to a pressure of 30 atmospheres produced about a gallon of oil, composed almost entirely of butylene, with benzole and an oil of doubtful composition. It was from this mixture that Faraday obtained butylene.

(e) Acetylene, or Klumene (C_4H_2). A volume of this gas contains its own volume of carbon vapour and one volume of hydrogen. The gas exists in but very small proportions in coal gas; and it is remarkable as being a hydrocarbon which can be obtained by the direct union of carbon with hydrogen, by igniting carbon, by the aid of electricity, in an atmosphere of hydrogen. It can also be obtained by exposing a mixture of carbonic oxide and marsh gas to the action of a high temperature,—a circumstance which may hereafter be of practical utility in the manufacture of gas. It is likewise a product of the decomposition of hydrocarbons by heat. The gas is colourless, with a peculiar odour, and it is probably anæsthetic. It is a little lighter than air, the specific gravity of it being 0·898; 100 cubic inches therefore weigh just 28 grains. It burns with a brilliant light, as you here perceive, and with a sooty flame, considerably longer than the flame of coal gas; and when I mix it with a large volume of hydrogen gas, it still burns with a bright flame. A cubic foot of the gas requires $2\frac{1}{2}$ feet of oxygen, or $12\frac{1}{2}$ feet of air, to burn it; and it produces two volumes of carbonic acid, and aqueous vapour. The gas is freely absorbed by water to the extent of its own bulk, and it is again expelled unchanged when the water is boiled. It also combines, with great energy, with chlorine, bromine, and sulphuric acid. The best absorbent for it is a solution of ammonio-subchloride of copper. The solution is made by mixing a dilute solution of chloride of copper with an equal bulk of pure muriatic acid, and shaking the mixture in a bottle with copper filings, or boiling it with copper turnings until it is colourless. The solution is then put into a bottle or flask, with three tubes adapted to it: one for delivering the coal gas into the solution, a second for the exit of the gas, and the third for pouring in a strong solution of ammonia. When the gas has displaced all the air from the bottle, ammonia is poured into the solution until a deep blue liquid is obtained; and this, as you here see, absorbs the acetylene of the gas, and produces a chocolate or reddish-brown precipitate of acetylide of copper ($C_4H_1Cu_2$), which is a compound in which two proportions of copper have replaced one of hydrogen. This acetylide of copper is to be collected on a filter, washed with water, and dried. If it is heated in a flask, as I am now doing, with dilute muriatic acid, it is decomposed, and the acetylene escapes with effervescence. You will notice, too, with what a bright yellow flame the gas burns.

(f) Benzole, or, as it is sometimes termed, Benzine, Phene, or Bicarburetted Hydrogen ($C_{12}H_6$). One volume of this vapour contains three volumes of carbon vapour and three of hydrogen. It exists in coal gas in very variable proportions. At times it is but barely discoverable, and at other times it is present in large quantity. It is often present in London gas to a considerable extent, and I attribute it to the practice which is occasionally followed of pouring light naphtha into the mains for the purpose of removing naphthaline. I here show you a specimen of nitro-benzole obtained from only 15 cubic feet of gas. The vapour of benzole is colourless, and it has a peculiar odour, which is rather agreeable when the benzole is pure. It is powerfully anæsthetic, and will cause fatal insensibility if it be inhaled too copiously. The vapour is about $2\frac{3}{4}$ times as heavy as atmospheric air, its specific gravity being 2·695; 100 cubic inches of it will, therefore, weigh 84 specific grains. The vapour burns with a very bright light—so much so that I have no difficulty in giving a strong illuminating power to hydrogen by merely passing the gas through a tube containing a little tow moistened with benzole. This is a good example of the naphthalization of gas; and I have here another instance of it where coal gas is passing over the benzole contained in a proper naphthalizer. You perceive the extraordinary richness of the light. Experiments have been made for the purpose of determining the value of the light for the benzole or naphtha consumed; and the results are, that every grain of the vapour taken up by a foot of common twelve-candle gas increases its light about 10 per cent. The various naphthas of commerce are more or less charged with benzole and its homologues, and they raise the illuminating power of gas from $4\frac{1}{2}$ to 8 per cent. for each grain of the vapour absorbed by the gas. In the act of burning, a cubic foot of benzole vapour consumes $7\frac{1}{2}$ cubic feet of oxygen, or $37\frac{1}{2}$ cubic feet of air; and it produces 6 cubic feet of carbonic acid, and much aqueous vapour. The heat of the flame also is considerable. Benzole is but slightly absorbed by water, but is freely taken up by alcohol, ether, and the volatile and fixed oils. It is also, like the other rich hydrocarbons, absorbed by vulcanized tubing. The vapour is slowly condensed by chlorine and bromine in the sunlight, and compounds are formed containing six proportions of the halogens ($C_{12}H_6Cl_6$ and $C_{12}H_6Br_6$), which present a certain analogy to Dutch liquid. Sulphuric acid also absorbs the vapour, and forms conjugate acids; but the most interesting product of benzole is its substitution compound with peroxide of nitrogen, which is produced when it is brought into contact with strong nitric acid. This, indeed, is the test for benzole; so that if coal gas is passed through fuming nitric acid, as you here see, the benzole vapour is absorbed, and an oily liquid is produced, which has the odour of bitter almonds. This is easily purified by washing it with water, and finally with a weak alkaline solution. It is then called Nitro-benzole, or Essence of Mirbane. It is produced from benzole by the substitution of one proportion of peroxide of nitrogen for one of hydrogen ($C_{12}H_5NO_4$); and I may remind you that, although it is used very largely in perfumery, it is a dangerous poison; I know instances where a few drops of it have produced fatal coma. Benzole vapour is decomposed by a red heat, forming a gaseous hydrocarbon, and depositing much carbon. It is also easily condensed by cold, when it forms an ethereal liquid, which freezes into a crystalline solid at 32°, and which boils at 177° Fahr. This liquid is lighter than water, and is remarkable for its solvent power for caoutchouc, gutta-percha, and all kinds of resins and fats.

(g) The other members of the benzole series, as Toluol ($C_{14}H_8$), Xylol ($C_{16}H_{10}$), Cumol ($C_{18}H_{12}$) and Cymol ($C_{20}H_{14}$), are no doubt also present in coal gas, for they are found in the naphtha distilled from coal tar; but as they are less volatile than benzole, they are present in smaller quantity.

(h) Naphthalin ($C_{20}H_8$) is the last of the hydrocarbons to which I shall refer. It is only present in gas which has been made at high temperature, and it is invariably a secondary product of the decomposition of the richer hydrocarbons (tar, etc.) by the walls of the red-hot retort. In London, where it is the practice to work at very high temperatures, the coal gas is always charged with naphthalin, and its presence in the mains is a serious inconvenience. The vapour of naphthalin is very rich in carbon—a cubic foot of it contains five times its bulk of carbon vapour, and four times its bulk of hydrogen. The specific gravity of the vapour is 4·422, and therefore 100 cubic inches of it weigh rather more than 137 grains. It burns with a bright sooty flame, and if I heat a little of the hydrocarbon in a flask, and pass hydrogen gas through it, you will see how richly it naphthalizes the gas. In the act of burning, a cubic foot of the vapour consumes twelve times its volume of oxygen, sixty times its bulk of air, and it forms 10 cubic feet of carbonic acid and aqueous vapour. Naphthalin is not absorbed by water, but it is by the volatile and fixed oils, and by naphtha and coal-tar; hence the advantage of keeping the raw gas until it is thoroughly cooled in contact with tar and ammoniacal liquor in a long hydraulic main. Hence, also, the fact that the richer qualities of gas, containing much hydrocarbon, do not deposit naphthalin; and hence, also, the use of naphtha as a remedy for naphthalin in the mains and service-pipes. The vapour of naphthalin is absorbed by chlorine and also by bromine, the products being liquids which have considerable analogy to Dutch liquid. It is also absorbed by sulphuric acid. Naphthalin is not easily decomposed by heat; it is quickly deposited by cold, forming brilliant white scales, which have a tendency to collect in the bends of pipes, and wherever there is an impediment to the easy flow of the gas. These scales are slowly volatile at ordinary temperatures; they melt at a heat of 174° Fahr., and they boil at 428°.

And now, in reviewing the facts which have been brought before us in an examination of the several hydrocarbons found in coal gas, the conclusions are—

1. That they belong to different groups, or series of compounds, in which the proportion of carbon and hydrogen rise by successive increments of $2 + 2$, and that the amount of hydrogen in them progressively decreases.

In the Marsh gas series, for example, the proportion of hydrogen is always two more than the carbon, thus:—Marsh gas, or Methyl-hydride, C_2H_4; Ethyl-hydride, C_4H_6; Propyl-hydride, C_6H_8; Butyl-hydride, C_8H_{10}; Amyl-hydride, $C_{10}H_{12}$, etc., all of which are found in the petroleums.

In the next series, the alcohol radicals, which may or may not be present in coal gas, the proportion of hydrogen is only one more than the carbon, thus:—Methyl, C_2H_3; Ethyl, C_4H_5; Propyl, C_6H_7; Butyl, C_8H_9; Amyl, $C_{10}H_{11}$, etc.

In the third series, which are the chief constituents of coal gas, the Olefiant gas series, the proportions of carbon and hydrogen are equal, thus:—Methylene, C_2H_2; Ethylene, C_4H_4; Propylene, C_6H_6; Butylene, C_8H_8; Amylene, $C_{10}H_{10}$; Capryolene, $C_{12}H_{12}$, etc.

In the next compound, Acetylene C_4H_2, it is two proportions less; and in the Benzol series it is six proportions less, thus:—Benzol, $C_{12}H_6$; Toluol, $C_{14}H_8$; Xylol, $C_{16}H_{10}$; Cumol, $C_{18}H_{12}$; Cymol, $C_{20}H_{12}$, etc.

And, lastly, in the Naphthalin series it is at least twelve proportions less.

2. We notice that the illuminating power of these hydrocarbons rises in proportion to the amount of carbon contained in a given volume of them,—marsh gas being the weakest and naphthalin the strongest.

3. We perceive that their weight, or specific gravity, rises with their photometrical value,—marsh gas being only about half as heavy as atmospheric air (0·5531), and naphthalin four and a half times (4·42); so that, if accidental impurities were not present in coal gas, the specific gravity of it would furnish a good indication of its quality.

4. We remark that all the richer hydrocarbons, excepting acetylene and naphthalin, are easily decomposed by heat, carbon being deposited, and a weaker quality of gas—generally marsh gas—produced. It is manifest, therefore, that these important constituents of coal gas will not bear contact with the red-hot walls of the retorts; and the practical conclusion from it is that they should be swept out of the retorts as quickly as possible, and that the temperature of the retorts, especially of the upper parts, should be as low as possible; in fact, the destruction of these bodies is not by the temperature to which the coals are subjected, but by the heat of the upper parts of the retorts upon which the distilled gases and vapours impinge.

5. We have observed that, with one exception (marsh gas), all these hydrocarbons are freely absorbed by chlorine, bromine, and strong sulphuric acid; and that in each case a very similar set of compounds is formed, Dutch liquor being the homologue of the haloid compounds. This indicates the difficulty of determining the photometrical value of gas by the amount of condensation with chlorine or bromine; for by such a process we have no knowledge of the particular hydrocarbon condensed. In my own experiments I find that the condensation may be very different, even when the gases examined have the same illuminating power; and, conversely, we may have the same amount of condensation for gases of very different illuminating powers: the number, therefore, 3·25, which is sometimes taken as the coefficient of power, is altogether unreliable.

6. We notice that all the richer and more condensable hydrocarbons are condensable by cold, and, therefore, that gas should not be subjected to a cold of 32°, or even much below 50° Fahr.

7. It is a fact, that water has little or no influence on any of the hydrocarbons, except acetylene; and as this exists in gas only to a very small extent, there is little or no danger from a copious washing of the gas before it goes to the purifiers.

8. It is worthy of remark that the hydrocarbons are freely absorbed by oils, and by vulcanized india-rubber tubing. This circumstance should be taken into account in

testing the illuminating power of gas, for I find that a flexible tube of about 30 feet in length will reduce the power of a weak gas to the extent of nearly 25 per cent.

9. It is not an unimportant fact that these hydrocarbons consume very different proportions of oxygen, and, therefore, vitiate very different proportions of atmospheric air; and, again, the explosive power of coal gas, when mixed with air, is much affected by the proportions of the richer hydrocarbons present. The explosive power of hydrogen, when mixed with its proper proportion of oxygen and fired, is about 26½ atmospheres; of marsh gas, about 38 atmospheres; of olefiant gas, nearly 44½ atmospheres; of propylene, about 66 atmospheres; and butylene, nearly 89 atmospheres; common coal gas, in exploding with its proper proportion of oxygen, exerts a pressure of about 34 atmospheres on the walls of the containing-chamber; and the proportion of air which is capable of giving the strongest explosion is 6½ times the bulk of the gas.

(*To be continued.*)

PEPPER.

BY JOHN R. JACKSON.

Of all the senses with which we are endowed, that of taste is perhaps the most fastidious; unlike the senses of sight and hearing, it is not so varied or widely affected by the force of education. To hear and appreciate the eloquence of an oration, needs some cultivated refinement, and is, in consequence, the belonging of a class. As applied to the sight, the same may be said of a fine picture or other work of art; but with the senses of taste and smell the case is different, though refinement and education undoubtedly lend a helping hand to the full appreciation of both. With the former, however, the likes and dislikes are more affected by nations than classes, and this, in a great measure, is doubtless to be attributed to the diversity of the products of each clime, the love for which is inherent in its people. For example, where can an Englishman find fare so well suited to his palate as in his own land? And a similar question may be asked of other nations; and yet there are countless productions of foreign lands, the uses of which have not become general with us solely through prejudice; and this applies not alone to articles of food, but also to materials useful in the arts and manufactures. It needs a persevering energy to bring new products into the English markets, and it needs even more to persuade the British public to give a fair trial to such products, many of which might become a source of commercial profit besides being advantageous to the consumer. As an example of this, the most familiar illustration is tea, which but 200 years since was scarcely known in this country, the Dutch East India Company having sent, in 1664, two pounds as a present to the king. When, however, an importation of a few pounds took place three years later, there was probably some prejudice against its general adoption. We venture to doubt that, as a new commodity in our own day, the pure aroma of tea would find little favour at first with the general public, though now, thanks to the energy and enterprise of modern commerce, the tea trade employs upwards of 60,000 tons of British shipping besides bringing an enormous revenue to the Government. What we have said of tea, might also be said of many other products, including pepper, with which we now propose to deal; even Pliny of old expresses some surprise that an article, as he says, possessing neither flavour nor appearance to recommend it, should become of such general use as it had in his day.

In a commercial sense, the word pepper has scarcely any restrictions or limit; nearly everything hot or pungent comes under the designation. Thus, we have cayenne pepper, which in reality is produced from various species of capsicum; melagueta pepper, the seeds of *Amomum Melagueta*, and Ethiopian pepper, the fruits of *Habzelia Æthiopica*. These in the customs returns, are all classed under the head "pepper," so that it is difficult to tell the exact amount of true pepper imported; but in a botanical sense, pepper is known as the product of one plant only, and that the *Piper nigrum*. To show the importance of this article in British commerce, as well as the large revenues it brings to the Treasury, we cannot do better than briefly trace the history and development of the pepper trade. It seems pretty clear that its uses were well known to the ancient Greeks; as a medicine it was also early known, being employed as such by Hippocrates. We quote the following interesting paragraph from Simmonds's 'Commercial Products of the Vegetable Kingdom':—"Pliny, the naturalist, states that the price of pepper in the market of Rome in his time was, in English money, 9*s.* 4*d.* per pound, and thus we have the price of pepper at least 1774 years ago. The pepper alluded to must have been the produce of Malabar, the nearest part of India to Europe that produced the article, and its prime cost could not have exceeded the present one, or about 2*d.* per pound. It would most probably have come to Europe by crossing the Indian and Arabian Ocean with the easterly monsoon, sailing up the Red Sea, crossing the Desert, dropping down the Nile, and making its way along the Mediterranean by two-thirds of its whole length. This voyage, which in our time can be performed in a month, most probably then took eighteen. Transit and customs duties must have been paid over and over again, and there must have been plenty of extortion. All this will explain how pepper could not be sold in the Roman market under fifty-six times its prime cost. Immediately previous to the discovery of the route to India by the Cape of Good Hope, we find that the price of pepper in the markets of Europe had fallen to 6*s.* a pound, or 3*s.* 4*d.* less than in the time of Pliny. What probably contributed to this fall was the superior skill in navigation of the now converted Arabs, and the extension to the islands of the Eastern Archipelago, which abounded in pepper. After the great discovery of Vasco de Gama, the price of pepper fell to about 1*s.* 3*d.* a pound, a fall of 8*s.* 1*d.* from the time of Pliny, and of 4*s.* 9*d.* from that of the Mahomedan Arabs, Turks, and Venetians." The pepper plant (*Piper nigrum*, L.) is a native of the coast of Malabar and the southern parts of India, but is now largely cultivated in the East and West Indies, Sumatra, Borneo, Siam, and other places within the tropics. It is a perennial with a climbing, shrubby stem; the berries or fruit are borne upon a spadix that is arranged in dense clusters round a central stalk, each of these spadices contain from twenty to fifty berries. The propagation of the pepper plant is chiefly by cuttings, though they will grow well from seed, but of course the plants take longer time before they come into bearing, which is a great consideration when pecuniary profit is the aim. The richer the soil, the better the plants thrive. In forming a plantation, the grower will take his cuttings and plant them perhaps from 7 to 12 feet apart. The climbing habit of the plants renders it necessary to provide some support for them to trail upon. Each individual plant is supplied with some kind of prop, but in many plantations these supports are cuttings of some spiny or thorny tree, which, striking in the ground and throwing out its leaves above, furnishes at once both a support and shelter for the young pepper plant. If grown on a rich soil the plants will bear fruit in a small proportion even in the first year, increasing their produce annually till the end of the fifth year, when they yield about eight or ten pounds per plant, and this is about the average produce up to fifteen or twenty years, after which the plants begin to decline, seldom or ever surviving beyond the thirtieth year. A pepper plantation has a peculiar yet picturesque appearance, the regular intervals between the plants and the plants themselves carefully trained against their props, gives to it an air of remarkable uniformity seldom seen in the cultivation of other crops. The plants, which, on account of their climbing habits are technically called pepper "vines," are allowed to run up their supports to a height of 3 or 4 feet; the tops are then bent down to the ground, and the young shoots which spring from these are tended with great care and neatly trained upwards. The plantations in Sumatra are said to be models of neatness and cleanliness, all weeds and refuse being carefully removed. The fruits when first formed are green, changing to red, and finally to black. When they make their first change from green to red, they are considered fit for gathering, for if left longer on the plants they are apt to drop off, besides losing a portion of their pungency. After gathering, the berries are spread on mats and exposed to the sun to dry; they are then rubbed between the hands to remove the short stalks. This constitutes black pepper, but both black and white pepper are the produce of the same plant, with this difference that the white is the largest picked berries, gathered at the fullest state of maturity, and denuded of its black outer husk by soaking in water. White pepper, as we all know, fetches a higher price in the market than black, not on account of its greater pungency, for, as we have seen, it has less, losing, as it does, much of that most important principle in the husk of which it is deprived, and also in the process of steeping and bleaching. A good story is told in Mr. Cameron's new book upon 'Our Malayan Possessions,' illustrating the ignorance of the directors of companies of the products or basis of the company's operations. The story runs somewhat in the following manner:—The directors of a Bencoolen pepper plantation, alert, as they should be, to the interests of the shareholders, finding that white pepper, which commanded a higher price than black, had as ready a sale and was therefore more profitable, immediately sent orders to the manager of their plantation for greater care to be bestowed upon the plants yielding white pepper than those yielding black. This must have been highly amusing to the growers themselves.

The black pepper vine is indigenous to the forests of Malabar and Travancore. Its cultivation is very simple, and is effected by cuttings or suckers put down before the commencement of the rains in June. The soil should be rich, but if too much moisture be allowed to accumulate near the roots, the young plants are apt to rot. In three years the vine begins to bear. They are planted chiefly in hilly districts, but thrive well enough in the low country, in the moist climate of Malabar. They are usually planted at the base of trees which have rough or prickly bark, such as the jack, the erythrina, cashew-nut, mango-tree, and others of similar description. They will climb about 20 or 30 feet, but are purposely kept lower than that. During their growth it is requisite to remove all suckers, and the vine should be pruned, thinned, and kept clear of weeds.

The berries must be plucked before they are quite ripe, and if too early they will spoil. The pepper vine is very common in the hilly districts of Travancore, especially in the Cottayan, Meenachel, and Chengaracherry districts, where, at an average calculation, about 5000 candies (of 500 lb. each) are produced annually. It is one of the Sircar monopolies. It may not be irrelevant to mention here the *P. trioicum*, Roxb., which both Dr. Wright and Megnel consider to be the original type of the *P. nigrum*, and from which it is scarcely distinct as a species. The question will be set at rest by future botanists. The species in question was first discovered by Dr. Roxburgh growing wild in the hills north of Samulcottah, where it is called in Teloogoo the "Merial-tiga."

It was growing plentifully about every valley among the hills, delighting in a moist, rich soil, and well shaded by trees; the flowers appearing in September and October, and the berries ripening in March. Dr. R. commenced a large plantation, and in 1789 it contained about 40,000 or 50,000 pepper vines, occuping about fifty acres of land. The produce was great, about 1000 vines yielding from 500 to 1000 lb. of berries. He discovered that the pepper of the female vines did not ripen properly, but dropped while green, and when dried had not the pungency of the common pepper, whereas the pepper of those plants which had the hermaphrodite and female flowers mixed in the same amount was exceedingly pungent, and was reckoned by the merchants equal to the best Malabar pepper.

Several varieties both of black and white pepper are known in commerce. Of the black the most valuable comes from Malabar, and is known as Malabar pepper. It is very clean, and free from dust and stalks. Penang and Sumatra pepper are also varieties of black, known in the markets, the former has, perhaps, a larger berry than the Malabar, but, unlike that, is very dusty. Sumatra pepper is the commonest, and consequently the cheapest; it is very dusty, and has a large proportion of stalks mixed with it. Of the white kinds, Tellicherry pepper is the most valuable, fetching a much higher price than any other of the white varieties: the berries are also larger, and of a purer white. The common white pepper of our shops is imported chiefly from Penang, and varies in price, according to size and whiteness, much of the white pepper, however, as seen in trade, is nothing more than the black Penang sort, bleached in England. Besides these varieties, there is a kind of bleached black pepper, the bleaching of which is effected by chlorine.

Great as is the consumption of pepper, the high rate of duty imposed upon it tends to cripple the full development of a trade which might become of vast proportions. An ample illustration of this fact is found in the increased consumption of pepper in the years following a reduction of the duty. In the early part of the present century the impost levied was as much as 1*s.* to 2*s.*, and even 2*s.* 6*d.* per pound, while the cost price in Singapore ranged no higher than from 6*d.* to 8*d.* In proportion as the duty was lowered, so the price of pepper fell, and the consumption became likewise proportionately greater. The prime cost of Singapore pepper at the present time does not exceed 1*d.* or 1½*d.* per pound, and that from Malabar, Sumatra, and Penang, about 4*d.*, while white pepper fetches from 9*d.* to 1*s.*, and perhaps 1*s.* 6*d.* In Singapore, where immense pepper plantations exist, the cultivation is chiefly carried on by Chinese settlers, who, owing to the heavy impost in this country, to which the bulk of their produce is shipped, find it a very poor and scarcely profitable speculation, requiring, as the plants do, so much care and attention. From the foregoing facts it is easy to see that, were the present duty of 6*d.* per pound reduced, we might expect a corresponding increase in our importations, which would probably add to, rather than diminish the public revenue, for we might safely depend upon the use of pepper becoming more extended, so generally appreciated as it is.

The plant which furnishes melaguetta pepper, or grains of Paradise, now pretty well known to botanists, seems remarkable for its variable size, especially as shown in its fruit. According to Dr. W. F. Daniell, the variety grown at Accra is the largest. The smaller, which grows on higher ground, is called in Fernando Po, *Toholo M'Pomah*, or M'Pomah pepper.

Specimens of the flowers of each variety are desirable to ascertain if they belong to one and the same species.

Of bastard or false melaguetta peppers there are several beautiful species, quite distinct and different from each other, and very imperfectly known to botanists. The fruit of some of them is used by the blacks for the sake of its acrid pulp, which is agreeable to the taste. They are tall, flag-like plants, with handsome flowers and fruits produced near the roots. Melagueta pepper, true or false, belongs to the botanical genus *Amomum.*—*Technologist.*

THE FLOWER FARMS OF FRANCE.

The growing of flowers for the production of fine essential oils and for medicinal purposes, is an important branch of horticultural industry in those departments of France bordering upon the Gulf of Lyons and the Mediterranean Sea, and especially in the southern portion of the Department of Var, adjoining the former Italian, but now French, province of Nice. There are extensive factories in Nismes, Montpellier, Morbihan, Nice, and some lately established across the sea in Algeria. Smaller establishments are found at Mentone, and all along the Genoese Riviera; but the great and acknowledged centre of this branch of industry, is the town of Grasse, situated about seventy-five miles E.N.E. of Marseilles, a few miles inland, and its seaport Cannes, well known as the winter residence of Lord Brougham. It would be difficult to state, with any degree of accuracy, the product of the flower-fields of this interesting region. There are over sixty factories in Grasse, which is a flourishing place of 12,000 inhabitants, giving employment in the various departments of field and in-door labour, to fully 5000 persons. Many manufacturers grow their own flowers, others buy them daily in the market, and still others are supplied by contract. The latter system prevails among the leading houses. Contracts are made, at a fixed price for a term of years, for the total product of a farm, at rates varying from 8 to 10 cents per kilogramme ($2\frac{1}{5}$ lb.) of Rose leaves, up to 1 dollar for Tuberose leaves, and even higher for Violet leaves; the latter being mainly produced at Nice. The average prices are about as follows:—Rose leaves, 8 to 10 cents the kilogramme; jasmine leaves, 40 to 50 cents the kilogramme; orange leaves, 50 cents the kilogramme; acacia buds, 60 to 80 cents the kilogramme; tuberose leaves, 1 dollar the kilogramme; violet leaves, 80 cents to 1 dollar 30 cents the kilogramme.

These are the leading garden-flowers used in Grasse; only small quantities of the jonquil, narcissus, hyacinth, mignonette, etc., are produced. A great breadth of land is devoted to Lavender, Rosemary, Thyme, Sweet Marjoram, Cherry-laurel, Sage, Balm, and other medicinal and culinary plants, which are sold at much lower rates than the products of the above-named flowers.

The preparations derived from all these plants divide themselves into four classes:—essential oils, distilled waters, pomades and oils, and dried leaves and flowers. It is true that considerable quantities of extracts of the pomades are manufactured and sold, but they are generally of inferior quality, and will not compare with those produced by the great perfumers of Paris and this country.

The great bulk of essential oils produced consists of lavender, rosemary, thyme, sage, spike lavender, and sweet marjoram. The most valuable products, of any considerable amount, are the essential oils of Neroli and Petit Grain. The former is the result of the distillation of orange-flower water, from the petals of the flower of the Bigarade or bitter orange (the sweet or Portugal orange yielding a somewhat inferior product), and the latter is obtained from the green leaves of the same tree. The price of Neroli varies with the season from 30 dols. to 40 dols. the pound, of Petit Grain from 8 dols. to 12 dols. These two oils are used extensively in the composition of Cologne water, and in combination with bergamot and rosemary, give its distinctive character. The orange-flower water is consumed in immense quantities in France, in the "eau sucrée" so universally drunk in the hot seasons; this, by the way, is the only form in which a Frenchman will drink water at all.

The bigarade orange tree also furnishes a rough-skinned, bitter, inedible fruit, from the rind of which is expressed an inferior oil called "essence bigarade," often used for adulterating the finer oils. The tree requires ten years to mature, and twenty to attain perfection, and yields an average of 17 lb. of flowers per annum.

Rose-water is also distilled in large quantities. A result of its distillation is a very minute proportion of otto of roses of the very highest quality; it appears in small supernatant grains or drops, which are carefully skimmed off and rectified. It is superior to the famous Kizanlik or Turkish otto, and, like it, congeals at ordinary temperatures in beautiful, transparent crystals. I saw, at the celebrated manufactory of Mr. Antoine Chiris, who was in all things the leader of his profession, a bottle containing about three pounds, which he valued at 550 dols., or over 11 dols. the ounce. It is not an article of export, the quantity produced being very small, but is reserved for use in unfavourable seasons, or a failure of the flower crop, to give strength and finish to the pomades and oils. The "Rose de Mai" (*Rosa centifolia provincialis*), or double May rose, is the one universally grown.

Another very costly article of which less than an ounce had been produced in Grasse at that time, is the essential oil of jasmine. Its existence in the flower was long and stoutly denied by the distillers, although they failed to prove what other principle caused its fine odour. In 1853 an Algerian chemist obtained a minute quantity, which cost him, we are informed, at the rate of 17,000 francs the kilogramme, or nearly 100 dols. the ounce. It has, since then, been produced at a cheaper rate, but still too dear for commercial purposes. The wild Arabian jasmine is grafted on the cultivated plant of the same species, acclimated, and bears for many years, if not winter-killed, yielding from 90 to 150 lb. of flower-petals per thousand plants. It is closely trimmed in spring and deeply covered in winter. The caterpillar is its most formidable enemy.

A most important branch, and one in which great rivalry exists, is the preparation of perfumed pomades and oils, which have a twofold use: first as bases for the finer kinds of hair oils and pomatums, and next as a medium for obtaining spirituous extracts for the handkerchief and the toilet; such as Lubin's well-known "Extraits pour le mouchoir." Their preparation is the most curious and interesting feature of the Grasse establishments.

The pomade "body," which is prepared in winter, is composed of 1 part of beef-suet and 2 parts of beef-lard (except for jasmine and tuberose, which is mainly lard, hardened by mutton or veal suet), thoroughly hashed, washed in several waters, and, among the best manufacturers, washed several times in rose water to deprive it of all unpleasant odour, then carefully melted and stored away in huge tin cans, in airy, cool vaults, for use in the season of flowers. Another preparation, called "corps dur," or hard body, is made of beef tallow only, and is used in the manufacture of stick pomatums. For the oils, the inodorous virgin olive oil is used, expressed from olives just before their maturity.

The busy operations of the year commence with the rose season.

There are two processes for impregnating the pomade body, and the oils with the floral odours—one by infusion and maceration, the other by what is termed "enfleurage." The first is employed for the strong, less volatile odours of the rose, orange, and acacia; the latter for the sensitive, ethereal perfumes of the jasmine, tuberose, jonquil, and all the bulbous plants, which will not endure the application of even a moderate degree of heat.

And, first, by infusion. About 100 kilogrammes (220 lb.) are put into a tin planished copper vessel, placed in a copper water-bath, melted at a low temperature, and charged, at daybreak, with a certain quantity of the freshly-gathered flowers, which are stirred constantly during the day and night, the mass being kept only warm enough to maintain a semi-fluid state. About midnight it is removed from the fire, poured into strong bags, made of fish cord, and subjected to heavy pressure in large perforated iron cylinders, standing vertically upon marble bed plates, which are gently warmed, to prevent the congelation of the exuding mass. Next morning fresh leaves are added, and the process repeated daily, until the desired strength of perfume is attained; the pomade is then poured into cylindrical tin boxes, and sealed up for shipment.

The oils are treated in the same manner as to maceration, but are filtered instead of being pressed.

The process of "enfleurage" is as follows:—Large numbers of "châssis," or sashes, are prepared, about 2½ feet long by 1½ wide, the frame itself being 2 inches wide and 1½ thick, holding a stout plate of ground glass, and resembling in construction a large school slate. Those for the oils are about 4 by 2½ feet, proportionately heavy, and, in place of the glass, have coarse iron-wire network. The large factories have several thousands of each of these frames.

Upon each side of the glass the pomade is thinly spread, and the surface is channeled or furrowed with a four-tined square-pointed wooden fork, so as to present the utmost surface for the absorption of the odour from the flower-leaves, which are thickly sprinkled upon it. The frames are successively charged with flowers, and piled one upon another, up to the ceiling. The leaves, confined between two strata of pomatum, wither, and yield up their odorate principle, which is rapidly absorbed. Daily renewals of the flowers are made, until the proper strength is obtained. The perfumed pomade is then scraped off gently, melted in a water-bath, and poured into cans.

In preparing the oils, coarse, heavy, spongy, cotton cloths, made especially for this purpose at Marseilles, are saturated with olive oil, and spread upon the netted frames; flowers are then strewed thickly upon them, and they are piled up in like manner as the pomade frames. When sufficiently charged with the odour, the oil is expressed from the cloths by powerful levers.

Many hundredweights of flowers and herbs are dried annually, are variously used in medicine, in cookery, and in the composition of scent-bags, cachous, fumigating-pastilles for the sick chamber, and kindred compounds of the perfumer's art.

The Parmesan or double violet is grown mainly at Nice, under the shade of trees, and yields a delicate and delightful perfume. It was the favourite odour of the Athenians under Pericles, and is now one of the most fashionable scents of the Parisian *beau monde*.

The flower-farms receive the highest culture. Under-draining was not practised at the period of my visit, but great attention was paid to irrigation. In some fields at Cannes there were complete networks of irrigating-tubes, substantially laid in cement. A constant warfare is waged upon insects, and each plant has its particular borer, grub, or bug. Continual vigilance is the price of success.

The heat in summer is intense, though tempered by the sea breeze; and the winter is, at times, as rigorous as at Washington or Richmond.

Male labour costs 35 to 40 cents per day, and female 15 cents.—*American Gardener's Monthly*.

MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The Fourteenth Annual Meeting of this Association was held at Boston, Mass., September 5th, 6th, 7th, and 8th, 1865.

The first session was held at 3 P.M. on the 5th, and was devoted mainly to the appointment of Committees and the reading of the President's Address. At the close of the address, a proposed amendment to the constitution, providing for a permanent secretary with a salary, was adopted.

SECOND DAY.—*Morning Session.*

The officers elected for the ensuing year were—
President—Henry W. Lincoln, of Boston, Mass.
First Vice-President—George C. Close, of Brooklyn, N.Y.
Second Vice-President—E. W. Sackrider, of Cleveland, Ohio.
Third Vice-President—C. A. Heinitsh, of Lancaster, Pa.
Treasurer—C. A. Tufts, of Dover, N. H.
Permanent Secretary—J. M. Maisch, of Philadelphia, Pa.

Corresponding Secretary—P. W. Bedford, of New York.

Committees—Executive: T. S. Wiegand, of Philadelphia, Pa., Chairman. Progress of Pharmacy: Enno Sander, of St. Louis, Mi., chairman. Drug Market: S. M. Colcord, of Boston, Mass., chairman. Scientific Queries: Wm. Procter, jun., of Philadelphia, Pa., chairman. Business: Dr. E. R. Squibb, of Brooklyn, N. Y., chairman.

The reports of committees for the past year were then read. The corresponding secretary read his report, which contained information in regard to the condition of the Colleges of Pharmacy in Boston, New York, Philadelphia, Baltimore, Cincinnati, Chicago, and St. Louis. The report contained a letter from the secretary of the British Pharmaceutical Conference, enclosing resolutions of amity and goodwill. This report, as well as the others, were referred for publication.

The replies to queries being now called for, papers were read by E. C. Jones, "On the seeds of *Cimicifuga racemosa*;" A. B. Taylor, "On Glycerine in Preparations, to prevent the deposition of Apotheme;" W. J. M. Gordon, "On the Substitution of Glycerine for Alcohol in extracting Drugs for Pharmaceutical Preparations;" Professor Wm. Procter, jun., "On *Liquidambar styraciflua*;" Wm. S. Thompson, "On the Dispensing of Ointments and Cerates;" and G. H. Menkoe, "On the Comparative Strength of Camphor Water as prepared by the process of the Pharmacopœia of the United States or Great Britain."

Afternoon Session.—Professor J. M. Maisch read a paper, "On the Poisonous Properties of *Rhus toxicodendron*;" Albert E. Ebert, "On the Sophistication of Rectified Oil of Amber;" P. W. Bedford, "On an Apparatus adapted to common use for obtaining a regular temperature between 120° and 160°, for the preparation of some of the officinal Extracts."

Dr. E. R. Squibb read a valuable paper "On the quantity of Alcohol necessary to be used in the preparation of Extracts." This paper was one of the most practical, as wel as interesting, of any presented to the Association.

Evening Session.—The greater portion of this session was devoted to informal discussion and the exhibition of novelties. A volunteer paper by J. M. Mill, entitled "Fidelity to the Pharmacopœia," was submitted.

THIRD DAY.

The reading of papers being resumed, Frederick Stearns read a short paper "On the Production of Peppermint in Michigan," being a statistical continuation of a similar paper presented a few years ago. Also a paper on "Native Wines from the Rhubarb Plant."

T. S. Wiegand presented a paper entitled "The Obligations of Pharmaceutists in respect to the instruction of those in their employ."

Some handsome specimens of Magnesium in ingot, wire, and ribbon, were exhibited on behalf of the American Magnesium Company.

A paper by N. G. Bartlett on an "Automatic Vacuum Apparatus," accompanied by illustrations, was presented and read on his behalf by Dr. Bartlett. The place of meeting was now finally taken up, and decided by vote to be held in Detroit, Mich., August 22nd, 1866, at three o'clock in the afternoon.

FOURTH DAY.

P. W. Bedford read a paper in reply to query, being "An Essay on Gas-heating Apparatus, adapted to the various purposes of the Apothecary." A variety of gas-stoves were exhibited in connection with this paper.

E. Parrish read a paper on the spirit tax, and the mode of licensing its sale in England. A long discussion ensued on the revenue law and its effects upon the pharmaceutists. A committee of five (since appointed by the president, consisting of Messrs. Squibb, Colcord, Moore, Procter, and Massott) was recommended and adopted, whose duty it shall be to take into consideration the whole subject relative to the internal revenue law in its relations to the objects of the American Pharmaceutical Association, with special reference to the alcohol question, with authority to consult with the Committee of Ways and Means of Congress and the Commissioner of Internal Revenue, and report at the next annual meeting.

After some informal remarks, the minutes were read by the secretary, when, on motion, the association adjourned.

BENEVOLENT FUND.

A meeting for the purpose of granting two annuities from this Fund of Thirty Pounds each took place at the House of the Society on Friday, 27th October; Mr. Sandford, President, in the chair.

Scrutineers having been appointed, and the votes examined, the Chairman, on the report of the Scrutineers, declared the following result:—

David Peart.	Charlotte Goldfinch.	Wm. J. Froom.	Thomas Novis.
875.	857	734.	188.

David Peart and Charlotte Goldfinch were therefore declared to be duly elected.

The votes polled for the unsuccessful candidates may be brought forward for four succeeding elections.

MISCELLANEA.

Accidental Poisoning by Essential Oil of Almonds.—An inquest was held at Alton, on Saturday, October 7th, by Mr. Hanfield, deputy coroner for Hants, upon the body of Eliza Chevis, a girl two and a half years old. In the early part of the week the child had a cough, and on Wednesday evening her father went to the shop of Mr. Knight, a chemist in the town, for two pennyworth of sweet oil of almonds and syrup of violets, which he had been in the habit of giving to his children when they had a cold. A boy served him with something from a bottle behind the counter, and when the child went to bed her mother gave her a teaspoonful of the mixture. She immediately spat it out, and the father, suspecting something was wrong, left with the intention of going to the chemist's, but was called back, when he found the deceased gasping and in a fit. Dr. Curtis was sent for, and he found her quite insensible and only breathing at short intervals. He tasted the mixture, and found it to consist of oil of bitter almonds. In about half an hour the child died from the effects of the poison. Mr. Knight said the boy who served the syrup was between fifteen and sixteen years of age, and had been told never to make up medicines in his master's absence, but go to another chemist in the neighbourhood for it. The jury returned a verdict to the effect that deceased died from having essential oil of almonds administered to her accidentally and by mistake.

Extractum Carnis (*Liebig*).—As the demand for this article has become so general, and as some of our readers may not be acquainted with the process for producing it, we give the following from Liebig's 'Familiar Letters on Chemistry.' Chopped meat, deprived of all fat, is boiled for half an hour with eight or ten times its weight of water, which suffices to dissolve all the active ingredients. The decoction must, before it is evaporated, be most carefully cleansed from all fat (which would become rancid), and the evaporation must be conducted in the water-bath. The extract of meat is never hard and brittle, but soft, and it strongly attracts moisture from the atmosphere. The boiling of the meat in the first instance may be carried on in clean copper vessels, but for the evaporation of the soup, vessels of porcelain should be used. Liebig's process for making beef-tea is as follows:—Raw beef (recently killed) ½ lb., distilled water 22½ oz., common salt 50 grains, dilute hydrochloric acid 16 drops; macerate the beef, chopped very fine, in the water, etc., for an hour and half; strain off through a fine hair-sieve; take two tumblers daily.

Accidental Poisoning by Opium.—The 'Cambria Daily Leader' reports a case that is singular from the manner in which an infant came by its death at Radyr, near Cardiff. On Tuesday Elizabeth Lee took her daughter Elizabeth, aged twelve weeks, to Mr. Edwards, surgeon, Canton, to be vaccinated. Mr. Edwards said the child was very healthy, and begged of her to bring it in a week, that he might take the matter from its arm. While they were talking, Mrs. Lee informed the doctor that an old female patient living at Radyr was in great pain that morning. He began to make up two powders, and the singular part of the story is that Mrs. Lee said they must not be purgative, as her child's bowels had been relaxed very much. He said, no, they would purify the blood, and secure healthy matter. He said she was to give her (meaning the old patient) one powder when she got home, and another at bedtime. About six in the evening Mrs. Lee gave her baby one of these powders, and in three hours it died. Mr. Edwards was then informed of the circumstance by the child's father, and he said the powder could not have caused the child's death, as it was an alterative; but seeing the man was on horseback, he said, "Are you from Radyr?" and on the man replying in the affirmative, the doctor at once said, "Then your wife gave her child the powder intended for the old woman." He explained to the jury, which sat at Llandaff, that he had vaccinated another child the same morning which needed medicine; and that with regard to the conversation with Mrs. Lee, he had in his mind the old female patient for whom he had made up some powdered opium. The jury found a verdict of "Accidental death by giving the opium through mistake;" but the surgeon was censurable for not exercising more care in giving the powders to Mrs. Lee for the old woman.

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 of 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.

W. W. (Aberdeen).—*Syrupus Ferri et Quinæ Citratis:* ℞ Ferri et Quinæ Citrat. ℥i; Aquæ Bullientis ℥i; Syrupi Simplicis ad ℥xx.—*Syrupus Ferri et Quinæ Phosph.:* ℞ Quinæ Phosphatis gr. xxxij; Acidi Phosph. Dil. ʒiv; Syrupi Ferri Phosph. ad ℥iv.

An Apprentice (Preston).—The use of *Cocculus Indicus* by brewers is illegal, and therefore the sale of the same, if known to be required for such purposes, is also illegal.

M. P. S. (Derbyshire).—Most probably *Pepsine Wine* is intended. See vol. xviii. p. 197.

A Minor Associate (Maidstone) wishes to know what is the proper order of mixing the ingredients of the following formula:—℞ Hydr. Chloridi ʒss; Hydr. Bichloridi gr. v; Liq. Calcis ℥ij; Aquæ ad ℥viij. Misce. Fiat lotio. We believe the intention of the prescriber to be the production of both oxides of mercury; and this would be the result if the chloride and bichloride of mercury are first mixed with the lime-water and well agitated, but if the calomel be oxidized with the whole of the lime-water, and the bichloride, dissolved in the water, then added, the resulting lotion will be very different in appearance, and, we should think, in effect also.

F. D. (London).—*Syrup of Superphosphate of Iron and Soda.* See vol. i. 2nd ser., p. 498.

A Correspondent (M. Soenen, Pau, France) wishes us to state that he has an opening for an English assistant.

Non-Botanist.—Bentley's 'Manual of Botany.'

Inquirer (London), and other Correspondents.—Pereira's 'Manual of Materia Medica is advertised to be ready on the 31st of October.

T. A. (Dowlais).—Apply by letter to the Secretary, 17, Bloomsbury Square, giving name and address.

An Assistant (Sussex).—We know of no such work.

J. B. G. (Torquay) thinks it undesirable that the wholesale and retail prices should be published together in this Journal.

Nescio (Chester).—1. The article in question is rendered liable to the duty by the wording of the label. 2. May be obtained on application to Mr. Sharp, Librarian, 17, Bloomsbury Square. 3. We are informed that "Pharaoh's Serpents" are provisionally patented.

Mr. Leay (Chilcompton) is thanked for his communication.

Langholm.—Fownes's 'Manual of Chemistry.'

W. H. K.—By adding Liq. Potassæ or Liq. Sodæ in excess to solution of corrosive sublimate.

Pharmaceuticus Juvenis.—1. The presence of iodate of potash. 2. The paper was probably coloured with Prussian blue. 3. *Ceratonia Siliqua.* 4. From decomposed sulphuric acid.

The communications of Mr. Symes and Mr. Barber will appear in our next number.

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.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VII.—No. VI.—DECEMBER 1st, 1865.

THE MEDICINE STAMP AND LICENCE ACTS.

In some remarks we had occasion to make last month relating to the sale of quinine wine, reference was made to the circumstances which render the sale of medicines liable to the stamp and licence duties. Our remarks were elicited by a correspondence which has recently taken place between Mr. Waters, the manufacturer of Waters's quinine wine, and the Board of Inland Revenue, in which is a statement made by the Assistant Secretary of the Board that appeared to be inconsistent with a previous decision of the Board on the same subject. On the 3rd of December, 1863, Mr. Corbett, Secretary to the Board, in a letter addressed to Mr. Sandford, President of the Pharmaceutical Society, said, "The Board, however, have instructed me to add that, except in cases where there may be reason to believe that a beverage is sold under colour of a medicine, they will not interfere with the sale, without an excise licence, of medicated wines of the description adverted to, provided that such medicines do not fall under the category of Patent Medicines." And then on the 31st of August last, Mr. Adam Young writes to Mr. Waters as follows:—"The Board having had before them your further application of the 3rd instant, I am directed to acquaint you that it had appeared to them, from their previous information, that your preparation 'Orange Quinine Wine' was sold as a beverage, and not as a medicine. But, after further inquiries, they are inclined, and think that it is more properly classed with medicines, and that the patent medicine licence and stamped label are required for its sale."

This latter statement appeared to us inconsistent, not only with the previous decision of the Board, but also with the existing state of the laws affecting the sale of medicines. There might have been something, as we admitted, in the circumstances under which Waters's quinine wine was sold, that rendered it liable to the stamp duty, and which would not apply to the preparation as usually sold by chemists and druggists; but we failed, on inquiry, to discover any such circumstances, and were ready to conclude that the Board of Inland Revenue had not correctly represented the law, when we were induced ourselves to look a little more closely into the subject. There have been several articles inserted at different times in this Journal on the Medicine Stamp and Licence Acts, but there is one especially, published more than twenty years ago, which gives a very full and clear explanation of the whole subject, and as we think it probable that many of our readers are, as we confess to have been ourselves, not fully cognizant of all the bearings of the case, we give here the article in full, with the exception of a few unimportant preliminary observations:—

"It is not easy to give in a concise form the substance of these Acts, which are now in force, and which have never been understood by the parties to whom they refer. The difficulty of reducing this subject to an intelligible shape is pointed out by Mr. Price, who was engaged on behalf of the trade, in the year 1829, in resisting the persecutions of the Commissioners of Stamps and common informers. Mr. Price observes, 'Prior enactments are nullified or neutralized by subsequent provisions, and schedules have been added which cannot consistently be read with or reconciled to the language of the Acts; because it has been attempted to schedule what is incapable of being scheduled. Those schedules were appended for the purpose, it must be presumed, of supplying any supposed deficiencies in the statutes; but there is an enactment in the body of the Acts for extending by construction the operation of those catalogues; and, finally, there are exceptions within exceptions, by which the exemptions appear at first sight to be resolved into the original enactments, and what was intended to give particular privileges has been nearly so generalized as again to exclude the exclusions.'*

"The second section of the 42 Geo. III. provides, that—

"'For and upon every packet, box, bottle, pot, phial, or other enclosure, containing any drugs, herbs, pills, waters, essences, tinctures, powders, or OTHER *preparation or composition* whatsoever, used or applied externally or internally as medicines or medicaments for the prevention, cure, or relief of any disorder or complaint incident to or in any wise affecting the human body, which shall be uttered or vended in Great Britain, there shall be charged a *stamp duty*, according to the rates following (that is to say), where such packet, box, bottle, pot, phial, or other enclosure as aforesaid, with its contents, shall not exceed the price or value of one shilling, there shall be charged a stamp duty of one penny halfpenny; and where above one shilling, and not above two shillings and sixpence, three-pence; above two shillings and sixpence, and not above four shillings, sixpence; above four shillings and not above ten shillings, one shilling; above ten shillings and not above twenty shillings, two shillings; above twenty shillings and not above thirty shillings, three shillings; above thirty shillings and not above fifty shillings, ten shillings; and above fifty shillings there shall be paid a *stamp duty* of twenty shillings.'

"By the sixth section it is further enacted, that—

"'Every *owner*, proprietor, maker, and *compounder* of, and *every person* in Great Britain, uttering, vending, or *exposing to sale*, or keeping ready for sale any such drugs, herbs, pills, waters, essences, tinctures, powders, or OTHER *preparations or compositions* whatsoever, used or applied or to be used or applied externally or internally as medicines or medicaments, for the prevention, cure, or relief of any disorder or complaint incident to or in any wise affecting the human body, or any packets, boxes, bottles, pots, phials, or other enclosures aforesaid, with any such contents as aforesaid, SUBJECT TO THE DUTIES herein *before* granted, shall annually take out a *licence;* and that for and upon every licence so taken out by any such person who shall reside within the cities of London or Westminster, the borough of Southwark, or within the limits of the twopenny post, or

* "Abstract of the Medicine Stamp and Licence Acts, with Observations on their Legal Effect and Operation," etc. By George Price, Esq., of the Middle Temple, Barrister-at-Law. 1830.

within the city of Edinburgh, there shall be charged a stamp duty of forty shillings; and for and upon every licence so taken out by any other such person who shall reside in any city, borough, or town corporate, or in the towns of Manchester, Birmingham, or Sheffield, there shall be charged a stamp duty of ten shillings; and for and upon every licence so taken out by any other such person residing in any other part of Great Britain, there shall be charged a stamp duty of five shillings.'

"The penalty for selling such articles without possessing a licence is £20. The fourth and fifth sections refer to certain exemptions similar to those contained in the 52 Geo. III., which is entitled '*An Act to Amend*' the former Acts, etc. etc. This Act repeals the schedule of 44 Geo. III., substituting another which contains a long list of patent and proprietary medicines liable to duty; an enumeration which is rendered almost unnecessary by the following paragraph:—

"'And also all *other* pills, powders, *lozenges*, tinctures, potions, cordials, electuaries, plaisters, unguents, salves, ointments, drops, lotions, oils, spirits, medicated herbs and waters, chemical and *officinal* preparations whatsoever, to be used or applied externally or internally as medicines or medicaments, for the prevention, cure, or relief of any disorder or complaint incident to, or in anywise affecting the human body, made, prepared, uttered, vended, or exposed to sale, by any person or persons whatsoever, wherein the person making, preparing, uttering, vending, or exposing to sale the same, hath or claims *to have any occult secret or art for the* making or preparing the same, or hath or claims to have, any exclusive right or title to the making or preparing the same, or which have at any time heretofore been, now are, or shall hereafter be prepared, uttered, vended, or exposed to sale, under the authority of any *letters patent* under the great seal, or which have at any time heretofore been, now are, or shall hereafter be, by any public notice or advertisement, or by any written or printed papers or hand-bills, or by any label or words written or printed, affixed to or delivered with any packet, box, bottle, phial, or other enclosure containing the same, held out or recommended to the public by the makers, venders, or proprietors thereof, as nostrums, or proprietary medicines, or as specifics, or as beneficial to the prevention, cure, or relief of any distemper, malady, ailment, disorder, or complaint incident to or in anywise affecting the human body.'

"The 52 Geo. III., which confirms the provisions above quoted from the former Acts, enacts also, that the stamps provided and supplied by the Commissioners of Stamps, denoting the duty charged on each packet, box, bottle, pot, phial, or other enclosure, shall be

"'Properly and sufficiently pasted, stuck, fastened, or affixed thereto, so and in such manner as that such packet, box, bottle, pot, phial, or other enclosure, cannot be opened, and the contents poured out or taken therefrom, without tearing such stamped cover, wrapper, or label, so as to prevent its being made use of again.'

"The penalty for non-compliance with this order is ten pounds.

"The following are the SPECIAL EXEMPTIONS:

"'It is provided by the fourth section, that it shall not be necessary for any victualler, confectioner, pastrycook, fruiterer, or other shopkeeper in Great Britain, who shall only sell any of the artificial or other waters *mentioned in the schedule hereunto annexed*, to be drunk in his or her house or shop, and which shall be actually drunk therein, *to take out a licence for that purpose under the provisions of the said Acts of the* 42*nd and* 44*th* years of his Majesty's reign, *provided such waters shall be sold by him or her in bottles, with paper covers, wrappers, or labels, duly stamped*, properly and sufficiently pasted, stuck, fastened, or affixed to the same in the manner hereinbefore mentioned; any thing in the said Acts contained to the contrary notwithstanding.

"'All drugs named or contained in the book of rates subscribed with the name of Sir Harbottle Grimstone, Baronet, and mentioned and referred to by the Act of Tonnage and Poundage made in the Twelfth Year of the Reign of King Charles the Second, and in another book of rates, intituled 'An additional Book of Goods and Merchandise usually imported and not particularly rated in the Book of Rates, referred to in the Act of Tonnage and Poundage made in the Twelfth Year of the Reign of King Charles the Second, with Rules, Orders, and Regulations, signed by the Right Honourable Spencer Compton, Speaker of the Honourable House of Commons, and mentioned and referred to by an Act made in the eleventh year of the reign of his Majesty King George the First.'

"'All medicinal drugs whatsoever which shall be uttered or vended entire, without any mixture or composition with any other drug or ingredient whatsoever, by any surgeon, apothecary, chemist, or druggist, who hath served a regular apprenticeship, or by any person who hath served as a surgeon in the navy or army under any commission or appointment duly entered at the War Office or Navy Office, *or by any other person whatsoever licensed* to sell any of the medicines chargeable with a stamp duty.

"'And *also all mixtures*, compositions or preparations *whatsoever*, mixed or compounded with, or prepared from medicinal drugs, medicated or chemical preparations or compositions or other ingredients, bearing different denominations, or having different properties, qualities, virtues, or efficacies, which shall be uttered or vended by any *such surgeon, apothecary, chemist, or druggist* as aforesaid, *or by* any such person who hath served as a *surgeon in the navy or army*, under any such commission or appointment as aforesaid, *the different* denominations, properties, qualities, virtues, and efficacies of which mixtures, compositions, and preparations as aforesaid, *are known*, admitted, and approved of, in the prevention, cure, or relief of any disorder, malady, ailment, or complaint incident to, or in anywise affecting the human body [and wherein the person mixing, compounding, preparing, uttering, or vending the same hath not, nor claims to have any *occult* secret or art for the mixing, compounding, or preparing the same], [nor hath, nor claims to have, any *exclusive right or title* to the mixing, compounding, or preparing, or to the vending of the same; and which mixtures, compositions, or preparations have not been, are not, nor shall hereafter be prepared, uttered, vended, or exposed to sale under the authority of any letters patent under the great seal], [nor at any time heretofore have been, now are, or shall hereafter be, by any public notice, advertisement, or by any written or printed papers or hand-bills, or by any labels or words written or printed and affixed to *or delivered with* any such packet, box, bottle, pot, phial, or other enclosure aforesaid, held out or recommended to the public by the owners, proprietors, makers, compounders, original or first venders thereof, as *nostrums or proprietary medicines, or as specifics, or as beneficial, for the prevention, cure, or relief of any such distemper, malady, ailment, or complaint as aforesaid.*'"

Mr. Price, in the pamphlet already quoted, has given the following explanation, which, with the extracts above given, will place our readers in possession of the most important features in the Acts, although we have not attempted to go into every detail.

There are, on the whole review of these Acts considered together, and with reference to their objects, and to each other, *four classes* of *persons* contemplated by the legislature, and *three sorts* of things as within the scope of the medicine duty laws.

The classes of persons are:—

First, Those who by apprenticeship to surgeons, apothecaries, chemists and druggists (and surgeons of the navy and army), derive the qualification of skill from discipline, for engaging and practising in the sale of drugs and medical preparations.

Secondly, Persons procuring the legal or statutory qualification of a licence.

Thirdly, Patentees of proprietary preparations in medicine, quacks, or nostrum-makers; and

Lastly, All unlicensed* venders of drugs and medical compounds.†

* "Unlicensed persons" must not be deemed to include persons unlicensed on the groun of the higher qualification.

† Confectioners, etc., are merely an exception.

The three things contemplated are:—

"First, Drugs, etc. entire.

"Secondly, Preparations and compounds of those of legitimate character; and,

"Thirdly, Such of the latter as are of spurious or empirical character.

"Of the four classes of *persons* contemplated by the Acts, the first class are exempted from all the restraining and disabling provisions, whether by clause or schedule, except that of the impost of *duties* on the third sort of things, which are the subject-matter of the statutes, if *sold* by them.

"The second class of *persons* contemplated are rendered capable of vending the *first* class of things without payment of other duty than that imposed on the necessary licence; and are authorized to sell the second sort of things, on payment *by them beforehand*, of the duties imposed on *their* sale by the law; and also to sell the third sort of things received from the owners or compounders, when stamped, as having paid the duty.

"The third class of persons consists of all *original venders*, makers, or proprietors of patent medicines (as they are termed), and empirical nostrums, whether patent or not; in other words, proprietors, makers, and *first venders* of the third sort of things above enumerated.

"Thus the statutes on this subject have made a clear distinction between persons qualified by education and persons authorized by licence to sell medicines. Those sold by the former are not subjected to duty, those sold by the latter are: hence the medicines sold by a surgeon, apothecary, chemist, or druggist are not chargeable with duties, which, when sold by a licensed vender of medicines, would be so chargeable. This was the great and main object of all the medicine stamp acts, and is the law made by those statutes.

"They have also created a similar distinction between medicines made and sold as nostrums and such as are not. Such preparations as are so made and sold are subjected to duty, whilst the same compounds sold in the regular course of trade are not. The same preparation may be a nostrum in the hands of one person, which may not be such in those of another. Thus, lozenges or pills, etc. made and sold in an open manner, after the common course of trade, may not be liable to duty; but when made as matter of mystery, and sold originally, or at first, with a catalogue of virtues ascribed to it in particular complaints, it becomes so liable, and must bear a stamp.

"It would appear from this statement, which we believe to be perfectly correct, that grocers, oilmen, hucksters, and other unqualified persons, cannot legally sell medicines either simple or compounded without taking out a licence, and cannot sell *compounded* medicines, such as tinctures, pills, etc., without attaching a stamp to each article."

This fully clears up and explains what previously appeared to be an inconsistency in the two communications to which we have referred from the Board of Inland Revenue. The first, addressed to the President of the Pharmaceutical Society represents the law as affecting chemists and druggists, while the second, addressed to Mr. Waters, represents the law as affecting those who are not privileged to sell medicines without a licence.

TRANSACTIONS OF THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, 1*st November*, 1865,

Present—Messrs. Bird, Bottle, Brady, Davenport, Deane, George Edwards, Evans Hanbury, Haselden, Hills, Orridge, Sandford, Savage, Squire, Standring, Watts, and Waugh,—

The following were elected—

MEMBERS.

Angior, John	Bootle.
Jones, Henry	Llanfachraith.
Best, James	London.
Roberts, Albinus John	London.
Stokoe, Thomas	London.
Williams, Cornelius	Pembroke Dock.
Bienvenu, John	Southampton.
Averill, John	Stafford.

BENEVOLENT FUND.

The first quarterly instalments of the annuities of £30 each were ordered to be paid to Charlotte Goldfinch and David Peart.

A grant of £5 was made to the widow of a late member at Birmingham.

EXAMINATION, 15*th November*, 1865.

MAJOR (Registered as Pharmaceutical Chemists).

Knight, Henry	London.
Sharp, David Blakey	York.
Wootton, Alfred Charles	Luton.

MINOR (Registered as Assistants).

Court, Alfred	Warwick.
Ford, Edward Beeke	Hereford.
Forth, William	Bridlington
Horton, Arthur Thomas	Scarborough.
Jones, Edward	Ryde, Isle of Wight.
Strachan, John	Aberdeen.
Thomson, Denzil	Worcester.

REGISTERED APPRENTICES.

Name.	Residing with	Address.
Bate, John Henry	Mr. Frost	Derby.
Foster, Charles	Mr. Horncastle	London.
Gibbs, James	Messrs. Anthony	Bedford.
Giles, George John	Mr. Groves	London.
Hawkes, Alfred Edward	Mr. Harris	Northampton.
James, David Philip	Mr. Williams	Newcastle Emlyn.
Margetson, James	Mr. Arnold	Norwich.
Marshall, Austen	Mr. Kendall	Stratford-on-Avon.
Pollard, Clement	Mr. Owen	London.
Porter, John James	Mr. Sutterby	Long Sutton.
Robins, Harvey	Mr. Lidwell	London.

Erratum.—Page 260, *for* "Certificate of Merit, Francis C. Clayton," *read* Certificate of Honour.

PHARMACEUTICAL MEETING.

Wednesday, November 1st, 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 Educational Times.
The Medical Circular.
The Chemical News.
The Chemist and Druggist.
The Veterinarian.
The Photographic Journal.
The Technologist.
The Assurance Magazine. From the respective Editors.
The Journal of the Chemical Society.
Proceedings of the Royal Institution of Great Britain. From the respective Socities.
Rinderpest, its Prevention and Cure, and Gypsum as a Sanitary Agent. By J. J. Lundy. From the Author.

The following papers were read:—

ON THE MEDICINAL USES OF THE INDIAN SPECIES OF BARBERRY.

BY L. W. STEWART, ESQ., SURGEON IN THE MADRAS ARMY.

[*Abstract.*]

Little is known, I believe, in the present day, of that ancient medicine named *Lykion Indikon*, prepared from certain shrubs of the order *Berberideæ*. The drug is of great antiquity, having been used by Dioscorides in a variety of complaints. Galen also mentions it as being most valuable, particularly the Indian variety. Two varieties were in use among the ancients, the one obtained from Lycia and Cappadocia, the other from India.

The medicine in the form of an extract is still used by the *hukkeems* or native practitioners of the East, under the name of *Rŭssot*, and is principally employed by them in cases of ophthalmia. I procured some of it from the bazar at Jubbulpore in 1857, but found it adulterated with a substance resembling aloes.

There are many species of *Berberis* indigenous to India, that is in the hill-ranges; but they are much alike in general appearance and medicinal properties, with the exception of *Berberis Leschenaultii*, also called *Mahonia nepaulensis* which has large pinnate leaves and round berries. For a full description of this order of plants, I beg to refer to Hooker's *Botanical Miscellany*, Drs. Hooker and Thomson's *Flora Indica* and *Præcursores ad Floram Indicam*, Colonel Heber Drury's *Useful Plants of India* and his *Handbook of the Indian Flora.*

In the *Indian Annals of Medical Science* for April 1856, there are two reports on Barberry and its preparations by Drs. W. S. Stiven and C. R. Francis. The former gentleman gives at some length its botanical description, its chemical and pharmaceutical history, medicinal action, etc.

It was in consequence of perusing this report that I was first induced to try the medicine in intermittent fevers when stationed at Jubbulpore in 1856–57. From that date up to the present, my experience of it (using a very strong tincture) as a remedy in all fevers, including remittent and typhoid, has been highly favourable. In dyspepsia too, and in diarrhœa, it is most serviceable. In disorders of the former class, I have combined arsenic with the barberry with most successful results, and in many instances have preferred the Tincture of Barberry to quinine, as it does not produce any of those disagreeable sensations which are caused by the latter. It acts very much in the same way as Warburg's Fever Drops. The dose in intermittent fevers is ʒiij with ♏v to ♏viij of *Liquor potassæ arsenitis*. The second dose may be given half an hour after the first, and then one drachm doses without the arsenical solution every two hours till two or three doses are taken. The patient must retire to bed and be well covered over as soon as the first rigor or chill is felt; and should the tongue be furred at the time, an emetic should be given previous to the administration of the tincture, and as soon as vomitation has ceased the tincture may be commenced.

The directions for taking Warburg's Drops are in fact very applicable to this Barberry Tincture, and I am much inclined to believe that the basis of this celebrated febrifuge is composed of Tincture of barberry, though it is commonly supposed to be a solution of bibirine, an alkaloid obtained from the Greenheart-Tree (*Nectandra Rodiæi*), which grows in the West Indics. Dr. Royle says that Dr. Maclagan obtained bibirine from Warburg's Fever Drops, but at the same time adds that "there has since appeared reason to suppose that this secret nostrum often, if not always, contains quinine. In a formula for making Warburg's Drops, published I believe in the *Lancet*, the ingredients are stated to be the following: Hepatic Aloes, Zedoary and Angelica Roots, Camphor, Saffron, Quinine and Rectified Spirit.

In the year 1858, I procured berberine in a crystalline form from the barberry which I received from Nynee Tal, and while Medical Officer at Ootacamund, I obtained a great quantity of the alkaloid from the Bark procured on the Neilgherry Hills.

Dr. Francis, in the volume of *Indian Annals* already quoted, states that both he and Dr. Macnamara, Professor of Chemistry at Calcutta, failed in extracting berberine, and I almost agree with him in believing the failure to be of little or no importance, as the tincture is so efficacious.

Barberry bark is now being used by many of the coffee-planters in Wynaad, where fever amongst the coolies is of very frequent occurrence.

Mr. Daniel Hanbury said the author of the paper appeared not to be aware that the barberry had been made the subject of chemical investigation, and that some important papers had been published on the subject.

Dr. Attfield said he had examined the specimens accompanying the paper just read. No. I. gave all the chemical and microscopical reactions of pure berberine. No. II. possessed similar characters, but apparently was mixed with a small quantity of a substance having a darker yellow colour than berberine, and less readily soluble in alcohol than that alkaloid. The quantity of material forwarded was insufficient to admit of the separation of the body mixed with the berberine in No. II.; it would probably be found to differ from berberine in degree rather than in kind, as its presence seemed simply to intensify the usual reactions of berberine.

Professor Bentley regretted that the author had not added to the value of his paper by giving some notice of the physiological effects of berberine on the human system. Some well-conducted experiments upon this point were much needed, as great uncertainty now prevailed. It was very remarkable to find in how many plants belonging to different natural orders berberine had been discovered. Professor Bentley had recently noticed, in more than one instance, the substitution of barberry bark for the official pomegranate root-bark. The former might be readily distinguished by its great bitterness.

NOTE ON RED OXIDE OF MERCURY OINTMENT.

BY MR. T. A. BARBER.

In the 'Pharmaceutical Journal' for last June, Mr. Mee made favourable mention of my recommendation to substitute yellow for white wax in the Ung. Hyd. Nit. Oxidi of the P. L. 1851. It certainly kept much longer without change, and I continued so to prepare it till the appearance of the British Pharmacopœia, when preferring, if possible, to adhere to the legal directions, I made it as ordered, of white wax, lard, and almond oil. The consistence was much improved, and this is all that can be said in its favour; for, by keeping, it not only became discoloured, but also rancid, an affliction to which the old ointment, being harder, was less subject.

The recipe that I now propose, and by which I have made some that remains after four months as good as when first prepared, is—

Hyd. Nit. Oxidi ʒj.
Cer. Flavæ ʒij.
Ol. Amygdalæ ʒvj.
Misce; fiat unguentum.

I thus discard both white wax and lard, discoloration being chiefly due to the former, and rancidity to the latter. The result has been an ointment which, for consistence and persistence, leaves nothing to be desired.

Professor Redwood said the note which had just been read was sent for insertion in the 'Pharmaceutical Journal,' but at his request the author had consented to its being read at the meeting. Short as the communication was, it related to a subject the introduction of which might elicit some discussion, and he was anxious, in common with others, to encourage the discussion of such subjects, especially at the present time, when the Pharmacopœia was under revision. There were two or three points to be considered with reference to Red Oxide of Mercury Ointment. In the first place, was the oxide made by heating nitrate of mercury, or that made by precipitation, best suited for the purpose? It would be recollected that several months ago Dr. Balmanno Squire recommended the substitution of precipitated oxide of mercury for the ordinary red precipitate in making the ointment, the precipitated oxide, which has precisely the same chemical composition as the other, being in a more uniformly minute state of division, and forming an ointment which, according to Dr. Squire's statement, possesses greater smoothness, and is therefore less likely to irritate the skin. It would be desirable to ascertain whether the ointment made with the precipitated oxide would admit of being kept without change as well as that made with red precipitate. Then with reference to the use of yellow (unbleached) wax, it appeared from the statement of Mr. Barber that the ointment made with this was less subject to change than that made with bleached wax, and this corresponded with observations which he (Dr. R.) had made in somewhat similar cases.

The Chairman observed that the preparation of ointments was one of considerable practical importance, as inconvenience was frequently experienced from their tendency to become rancid. There was one point he would mention that could not be too carefully attended to, and that was to have the pots in which ointments were kept for use perfectly cleansed, by scalding them out before putting freshly-made ointments into them. This was often neglected, and the residue of an old and rancid ointment being left in the pot, would soon spoil what was added to it.

Mr. Martindale thought an improvement might be effected in *Unguentum Plumbi Subacetatis* by substituting oil of almonds for olive oil.

Mr. Clayton said he had found red precipitate ointment made with oil of almonds and white wax to keep well for eight months, but in that case the wax used was pure block wax.

ANALYSIS OF A QUACK IMPOSTURE.

BY DR. ATTFIELD,

DIRECTOR OF THE SOCIETY'S LABORATORIES.

I desire to bring before the members of the Pharmaceutical Society, chemists and druggists generally, and the public, an analysis of a substance which is stated to be cod-liver oil, in the form of an agreeable saccharine powder, but which does not contain a trace of that medicine.

This substance is sold in small flat boxes of two sizes, containing respectively about four and two ounces of a white powder, and having labels in French, the translation of which is as follows:—" Oleo-Morrhuine, or Saccharide of Cod-liver Oil: 6 francs or 5 shillings the box; $3\frac{1}{2}$ francs or 3 shillings the half-box. This saccharine powder, by reason of the extreme division of the oil, is, in a very small bulk, more efficacious than all the cod-liver oils of commerce, as already proved by long experience. General depôt, Roberts and Co., Pharmaciens, 23, Place Vendôme, Paris; and Wilcox and Co., Chemists, 336, Oxford Street, London." Around the box is a label, also in French:—" Easy to take and more efficacious than the cod-liver oil of commerce, which often becomes prejudicial on account of the nausea which it inspires." On the inside of the lid of each box is another label: " Saccharide of Cod-liver Oil. This powder has the great advantage of being supported by all stomachs, and of easily assimilating itself in the organism. This precious result is obtained by the extreme division of the oil, whose elements (chlorine, iodine, bromine, phosphorus, and sulphur, etc.) are absorbed without repugnance, whilst the oil of commerce is rejected, and often becomes prejudicial by the nausea which it inspires."

The obvious intention of the writer of these labels is to induce persons ignorant of the properties of oils to believe that the well-known medicine cod-liver oil has been brought into a state of minute division by being mixed with a saccharine powder; that in this state it is so much more active, that a small dose will have as great an effect as a much larger dose of the oil itself; and that the natural tendency of cod-liver oil to become rancid and nauseating is prevented by the influence of the saccharine matter added. Any one, however, conversant with the characters of oil, must at once see that this nostrum cannot be what it is stated to be. For oil, minutely divided by the agency of a powder, presents so much surface to the air that it becomes rancid in a far shorter time than when in bulk: such a mixture would soon be so offensive to the nose and palate as to be utterly unsaleable. If to this be added the facts that the action of cod-liver oil on the system is *not* materially influenced by its state of division, and that the amount of oil which can be added to powdered sugar without the latter losing its pulverulent form is so small, that a teaspoonful of the mixture would have no appreciable effect when swallowed, it must be evident that this so-called saccharide of cod-liver oil contains no cod-liver oil at all.

But if not cod-liver oil, what is it? It is nothing but powdered milk-sugar. A considerable amount of this sugar is now extracted from milk, chiefly for use in the manufacture of homœopathic globules and certain varieties of infant's food; it can therefore be obtained readily and cheaply. A quantity costing a few pence is placed in a box, labelled so as to induce the public to believe that it is cod-liver oil in a concentrated, convenient, and palatable form, and forthwith sold for five shillings. Surely this is obtaining money under false pretences.

The method by which the analysis of this quack imposture was effected was simply the application of the ordinary chemical tests for saccharine bodies, the presence of one of which was indicated by the labels. That it was wholly milk-sugar was proved by ascertaining that a given quantity of it, dissolved in water, produced the same kind and degree of effect on a ray of plane polarized light as was exerted by a similar quantity of milk-sugar of known purity. "Chlorine, bromine, iodine, phosphorus, and sulphur, etc." were, of course, absent.

The CHAIRMAN observed that impositions such as that just brought under their notice, were deserving of exposure, and there were no doubt many similar cases that might be made subjects for future communications. The case of opoponax, alluded to in the last number of the 'Pharmaceutical Journal,' was not the only case of the sort.

Professor REDWOOD said the opoponax case belonged to England, but that which Dr. Attfield had alluded to appeared to have been an importation from abroad, and from a country where they were given to understand such things were managed better than in this country. He certainly could not understand how so flagrant an imposition as this was could be practised with impunity in France, where stringent laws existed with reference to the sale of secret or patent medicines.

Mr. JONES believed the so-called "saccharide of cod-liver oil," although prepared in France, emanated from an English house there. He had had some opportunities of observing the state of pharmacy, and the operation of the laws relating to it in France, and could say that although an imposition such as that alluded to would be punishable by the existing law there, yet evasions of the law were frequent, and quackery was practised to a great extent. An alteration in the law relating to pharmacy was under consideration by the French Government.

THE MEDICINE STAMP AND LICENCE ACTS.

Professor REDWOOD made some remarks on this subject, the substance of which is embodied in an article inserted in another part of the present number of this Journal.

PHARMACEUTICAL MEETING, EDINBURGH.

The first meeting of the present session took place in St. George's Hall, 119A, George Street, on Monday evening, 13th inst., at nine o'clock. There was a good attendance.

Mr. Hemp, President, in the chair.

The following remarks were made by the President:—

Gentlemen,—In accordance with the usual practice at the first meeting of the session, it falls to me, as your President for the time being, to begin the proceedings with a few remarks on some of those matters which affect us as a Society, and in which we take an interest as Pharmaceutists.

But before doing so, I desire to thank you for calling me a second time to occupy such an honourable position, and to assure you that while I would gladly have been relieved from the responsibility of office, and seen the duties of the chair entrusted to abler hands, it will give me pleasure to attend to them for another year, and be my endeavour to do so with increased zeal and efficiency.

I desire also to say that I have much pleasure in again meeting so many of the members and friends of the Pharmaceutical Society, some of whom have been for many years steady supporters of our meetings, and by their presence and assistance done much to render them successful and attractive, and to encourage the younger branches of the profession to improve such opportunities of acquiring knowledge, and cultivate an acquaintance with the science as well as the practice of Pharmacy.

On taking a retrospect of the interval between the last session and the present, I think it will appear to many of us, that the event most deserving of notice, in connection with our business, is the unexpected failure of our efforts as a Society to obtain further and improved legislation respecting the position and qualifications of Pharmaceutists.

Two Bills for this purpose have been introduced into Parliament—the one promoted by the Council and Members of the Pharmaceutical Society, and the other by the United Society of Chemists and Druggists—and after considerable discussion remitted to a Select Committee. The committee, however, knowing that the session and the Parliament were about to expire, seemed to have little heart for the work assigned them, and accordingly it was tardily entered upon; and though the business of hearing the evidence appeared for a time to be prosecuted with zeal, it soon became evident that they had no intention to grapple with the subject, so as to bring about a speedy and satisfactory settlement of the questions involved, and hence the work was suddenly abandoned, and a report agreed on, recommending the Government to take the matter in hand, and introduce a Bill to regulate the sale of dangerous drugs, and to provide for the examination and registration of all who, after a certain period, desire to assume the title of Chemist and Druggist.

Whatever may be the result of that recommendation, it will be the duty of the Council, in London, to watch the action of Government in the matter, so as to secure, as far as possible, the objects originally contemplated, to use the influence of the Society in support of any movement which promises to be of general benefit, and, which is not less important, to prevent unnecessary and impracticable restrictions being placed on the mere sale of drugs, which would certainly be the result of the adoption of some of the clauses of the United Society's Bill.

While it is natural that some disappointment should be felt at the apparent want of success which has attended this effort of the Pharmaceutical Society to carry out what was believed to be an important part of its mission, in a manner intended to be beneficial to all engaged in the business of pharmacy, whether Pharmaceutical Chemists or not, there is no reason to regret that the effort was made, because it has been, in many respects, productive of good. It has shown the Society who and what it has to contend with. It has called public attention to the necessity for a higher pharmaceutical training, and for testing the qualifications of dispensers of medicine by examination. It has brought the character of the Society as an educational institution, its services and objects, more prominently into view; the natural result of which is, that the value of its diploma is now better understood and appreciated, and will no doubt continue to be so in proportion as the medical profession and the public realize the fact that it is a certificate of qualification, by a Board of competent examiners.

Notwithstanding this, however, it appears that the desire to obtain a higher educational standard for Pharmaceutists is in a few cases looked upon with some degree of suspicion, and fears have been expressed lest by over-education they should be tempted to step beyond their proper province, and combine with the practice of pharmacy the practice of medicine. Now I believe you will concur with me in thinking that there is very little cause for apprehension in that direction, that the real danger to be feared is ignorance, which begets rashness, and that the better we are informed, the more likely we are to see the imprudence of such a course, and therefore to avoid it. But while saying this, it must at the same time be admitted that when the Pharmaceutical Chemist, or chemist and druggist, is qualified by education to engage in the practice of medicine, there can be no serious objection to his doing so; it is just a question of expediency, which he must determine for himself; experience, however, being against such a combination, it is rarely tried, and hence we find that even those Pharmaceutists who have received a medical education, and hold the diploma of the Royal College of Surgeons, confine themselves strictly to their own department. Of this there is ample evidence in Scotland; but looking merely to this branch of the Pharmaceutical Society, we find that three of the former occupants of this chair were surgeons, none of whom practised medicine, and one of our present examiners is a surgeon, engaged exclusively in the business of pharmacy. But while we wish it to be distinctly understood that, as Pharmaceutists, none of us engage in what is called "practice," it is surely carrying the matter further than is necessary or desirable, to expect that we should invariably refuse to give advice, even in trifling ailments which obviously do not require the exercise of medical skill, because it is almost impossible to avoid it, and because it is due to our own position to show, when we are asked, that we know something of the nature and doses of medicines, and the usual modes of administering them, and in this way secure the good opinion of our patrons, not only without interfering with the duties of the qualified practitioner, but in a way which tends rather to aid his efforts; for when applications are made to us for advice and medicine in cases of importance, they generally, if not invariably, result in a recommendation to call in medical assistance, and thus in many instances early and proper treatment is obtained which might otherwise be delayed, or altogether neglected. I do not allude to this subject for the purpose of obtaining credit for generosity and forbearance in refusing to undertake the treatment of medical cases, but rather to prevent misconceptions as to our real views and practice, to indicate the course which we have followed hitherto, and to which we believe it is our interest steadily to adhere.

You will no doubt have observed with pleasure that the Benevolent Fund is rapidly becoming an important and valuable institution in connection with our Society, and likely to be of great benefit to those of our members who, from any cause, may be unfortunate in business, and thus require its aid. I would heartily commend it to the favourable consideration of all the members, but especially of those in Scotland, who, I fear, have not yet given it the attention and support which it deserves. Let us hope that this will no longer be the case, and that there will be a large increase in the number and amount of the subscriptions. It is desirable and highly proper that a portion of our liberality should be turned in this direction, and that the more prosperous among us should give of their abundance to relieve the wants of their less fortunate brethren, who, though perhaps honest and industrious, and at one time contributors to the funds of the Society, may yet have been unable to provide anything for old age, or misfortune, or those beloved objects who, by their death, may be deprived of their sole means of support.

In common with the rest of the trade, I have no doubt we were all surprised to hear of the prosecutions commenced in London in connection with the sale of capsuled goods, and the alleged infringement of Betts's patent, for the manufacture of the metal of which the capsules are made,—the unreasonableness and injustice of which strike one as almost too great to be believed. Unfortunately, however, there is no room to doubt the fact, a large number of bills in Chancery having already been filed, and several cases settled by compromise. While we have to congratulate ourselves on the fortunate circumstance that the patent does not extend to Scotland, and that in the meantime at least, we have no cause for alarm, our English brethren may be assured that they have our cordial sympathy, and that we earnestly desire their speedy deliverance from such oppression. It appears uncertain how the law of the case stands in England, but it is hardly possible to imagine, that even under the patent such proceedings could be attended with success in Scotland. Hence it is to be hoped that the equity of the case would be considered, not only as regards the rights and interests of the patentee, but as regards the rights and interests of the public, who are entitled to protection from such unjust exactions. It surely cannot be expected that in order to obtain this, we should make ourselves acquainted with the specifications of patents, or the various kinds and composition of capsules, which it is impossible, by ordinary means, to distinguish from one another. There would neither be comfort nor safety in conducting our business, if such a state of things were allowed to exist, because the contents of the bottle, the bottle itself, the cork, the label, the paper top, might, for anything we know, be all infringements of patents; and therefore it is not enough for our friends in England to endeavour to protect themselves by destroying the dangerous capsules, or refusing to take them into stock; they ought to carry out their intention to try the case, for they can hardly fail to establish their non-liability for the acts of others over whom they have no control, and of the fact, the nature or the degree of whose culpability they have no knowledge whatever.

As you are all aware, another Pharmaceutical Conference has lately been held at Birmingham, at which a greatly increased number of members were present, and looking to the variety and excellence of the papers read, the practical importance of many of the subjects, and the ability and research displayed by the authors, it was successful even beyond our expectation, and will no doubt exercise a powerful influence in promoting the objects which, as a Society, we have in view, viz. the advancement of pharmaceutical science, and the elevation of the standard of pharmaceutical attainment throughout the country.

In conclusion, I have now a very pleasing duty to perform, which is, to introduce Dr. Scoresby-Jackson, who has kindly undertaken to open the real business of the session by giving us an address. I do not know what the subject is, but having a lively recollection of the excellent paper which he read to us on a former occasion, and knowing his ability and the interest which he takes in everything connected with pharmacy, I think we may rest assured that it will be one which will repay our best attention.

Dr. Scoresby-Jackson, on being introduced to the meeting, gave the following introductory address:—

Mr. President and Gentlemen,—I had great pleasure in acceding to the request of your Council that I would give the opening address of the session upon which you are now entering; but, it was far easier to express my willingness to do what I could to promote the welfare of the Pharmaceutical Society, than to call to mind the right way of doing it. When, therefore, I began to cast about me for a subject, I felt a little at a loss, because, being the first address of the Session, I conceived that I was somewhat restricted to one of a general character, interesting alike to all the members of the Society, as touching the history, position, or prospects of the Society itself, and of my qualifications for the preparation of such a communication I confess I have some misgivings. Prompted, however, by a cordial wish for the prosperity of the Society, it occurred to me that I might offer a few remarks to those who are now entering upon the study of Pharmacy, and who will, one day, I hope, adorn the higher ranks of their profession, believing that nothing can be dearer to, that nothing can touch more closely the future of the Society, than the welfare of its apprentices. There is only one more prefatory word that I would address to all my hearers before turning exclusively to the younger members, and it is this, that what I am now about to read to you was written with a running pen, for my professional duties, which have the first claim upon my attention, have left me but little time for the preparation of this address, that I do not presume to speak to you in the name of the profession to which I have the privilege to belong, but simply in my own, and, lastly, that the observations which I am about to make are merely the expression of occasional thoughts, and are to be received only for so much.

To you, gentlemen, who are now entering upon the study of Pharmacy, who are still untaught in it as an art, and are unacquainted with the sciences upon which it rests, I wish to address myself, endeavouring to point out to you the path which you will have to tread, if your object be, as it ought, to attain the highest walk in your calling. The occupation of the Pharmaceutical Chemist, which it is presumed you have chosen upon sufficient grounds, is divisible into two parts, one professional, the other mercantile. With the latter part of your vocation, that which consists in buying and selling, I have nothing to do, it belongs exclusively to your *guild;* but in the professional part I take a deep interest, not only on account of my peculiar association with it as a teacher of Materia Medica, but also because of my general relations, as a physician, to the public on the one hand, whose sanitary welfare is the constant anxiety of the profession to which I have the honour to belong, and, on the other hand, to you, to whom that profession earnestly looks for able, conscientious, and enlightened support.

It is expected that you bring with you a fair amount of scholastic knowledge, including the Latin language, without which you cannot advance a single step; and that you possess a certain aptitude for your calling, without which you will neither be able to comprehend its mysteries, nor to perform the manipulations which its practice requires. Being thus fitted to your vocation, let me draw your attention to your future career, and we may view it in three stages, namely, your practical education, your scientific education, and lastly, your relations, duties, and privileges as qualified Pharmaceutical Chemists.

By your practical education, I mean that which you are to learn during your apprenticeship, respecting the profession of Pharmacy, in the laboratory of a Pharmaceutical Chemist. At first your duties are very simple, but by no means unimportant. You are to become acquainted with the instruments by means of which all your future operations are to be conducted, and you are to acquire, by practice, facility in weighing and measuring with neatness, dexterity, and scrupulous exactness the substances that are to be used as medicines. At first, only the less powerful medicines will be placed under your charge; they will be put into your hands in order to prevent the danger of your mistaking one for another, and your business will be to preserve a ready supply of those simple preparations which are most frequently required. At the same time you will exercise yourself in the recognition of drugs, so as to be able to distinguish one from another, and each by its own peculiar characters; and, in course of time, so far as their outward characters will determine it, you will be able to discriminate between good and inferior specimens of the same article. About the time when you are thus far advanced you will be trusted with a physician's prescription; at first, one which is plain and simple, for those which contain drugs of great activity are invariably dispensed by the principal, or by an experienced assistant. And you are to bear in mind that the dispensing of a physician's prescription is no light matter: possibly the life of a fellow-creature may rest upon it, and certainly your success in life will very much depend upon the manner in which you accomplish it. Therefore, from the first, you should study to be cautious and accurate, neat and cleanly in this part of your duty. I shall have more than once again to refer to the subject of dispensing, and I have now only to recommend a diligent use of your time during the period of your pupilage, in which, of course, there are many things to be learned in connection with the trade of pharmacy, to which it is not within my province to refer.

When you have mastered the routine duties of the pharmaceutical laboratory, and are become a skilled practical workman, you will desire to know something about the sciences which control those operations, in the performance of which you are now supposed to be proficient. But before you finally adopt any plan of study at this stage of your career, I would strongly urge you, if you have not already done so, to fix inflexibly upon that course of life which, under Providence, you are determined to pursue to the end. It may seem odd to some of you that I should offer such a suggestion as this when you are already so far on the way to become Pharmaceutical Chemists; but I have this reason for doing so. It not unfrequently happens that a youth enters upon the calling of a Pharmaceutical Chemist simply because neither he nor his friends know very well what else he can be, a sort of vague and tentative choice, which is not by any means peculiar to pharmacy, since, indeed, every profession and trade has its number of such indecisive apprentices, who, pursuing their elementary avocations without a determinate ultimate purpose, at length become unsettled, dissatisfied, and desirous of change. Now, it is at this juncture, when entering upon a course of scientific study, that an irresolute mind is apt to wander from its first intention; and it is especially so with the student of pharmacy, for then begins an intercourse with the medical student, into whose path he is for a certain period thrown, and of whose future career he is apt to be somewhat emulous. It is necessary, therefore, to determine what you are to be. You cannot, even now, enter into favourable competition with the medical student, because he has already reaped the advantages of a suitable preliminary education, such as you cannot now attain, and, therefore, in the race of professional life he would indubitably leave you far behind. If you allow this opportunity to pass you, your change of purpose to become a medical man would be still less promising; nevertheless, I have met with several instances of pharmaceutical students entering, long after the periods of their apprenticeships, upon the study of Materia Medica, quite undetermined as to whether they would continue as Pharmaceutical Chemists, or would endeavour gradually to acquire the title and privileges of medical practitioners. If you were to ask my opinion of such changes, I should tell you that I consider them very unsatisfactory to the person chiefly interested. If his talents be insufficient for a Pharmaceutical Chemist, he will seek in vain to apply them to the study of medicine; if his qualities entitle him to a position in the higher ranks of the learned world, he will injure himself by leaving that calling in which he has already to a certain extent distinguished himself, to enter upon one in which, considering the many disadvantages which would attend him, he could scarcely hope to attain more than a barely respectable position; and if the change be prompted by a restless, wandering, untutored disposition, he would be out of place everywhere. But there is a far weightier reason for recommending to you a steady and diligent adherence to the study of pharmacy; namely, that the field of scientific pharmacy offers you the richest return for the labours which you may be disposed to bestow upon it. I may be permitted to say, without the smallest disparagement to those able men who have worked in it, or to those who are still toiling in it, that pharmacy has been less cultivated in this country than almost any other branch of practical science, and that it is far behind the position which it ought by this time to have attained, simply on account of the paucity of labourers employed in the field. The Pharmaceutical Society has done much to induce its members to pursue their calling upon a higher platform than that of mere commerce; but it is only by encouraging the youth of the profession to devote themselves ardently to their studies, that the Society can hope to raise a force of well-disciplined and intelligent labourers capable of gathering the harvest which is still waiting to be reaped. For myself, I cordially commend you to a hearty and diligent pursuit of your calling, firmly believing that ample honours and satisfactory emoluments await you if you persevere. And, from the very outset, let it be the aim of each of you to attain the highest position which his strength and capacity can entitle him to; for though all may not reach the summit, yet all who try may attain highly creditable positions, and the more that there are who rise above the level of mediocrity, the more honourable will be the status of every Pharmaceutical Chemist.

But, to return from this digression, you are now to enter upon a course of scientific study, and you wish to know to what subjects you can most profitably devote your attention. They may be divided into two classes, namely, the essential and the non-essential.

Chemistry is essential, because it enables you to recognize many substances which are not distinguishable by their physical characters alone, it enables you to take each substance to pieces so that you may learn of what it is composed, it enables you to foretel the changes that will take place when you bring together two or more substances which tend to an interchange of elements, it enables you to separate the active from the inert constituents of organic medicines, it enables you to apply antidotes in certain cases of poisoning, it enables you to detect the adulterations which are but too common in imported drugs, and it enables you to perform with ease and intelligence many operations which would otherwise be vexatious and mysterious, and to produce articles in a useful and elegant form which would otherwise be clumsy and to a considerable extent inert. Associated with chemistry, I think that an elementary course of *Physics* or *Natural Philosophy* is also essential, whereby you would learn to perform dexterously, and with a minimum of force, many mechanical operations, and to comprehend many appearances, actions, and results, which do not fall within the province of the lecturer on chemistry to explain.

Botany is essential, for it is the science that teaches you how to distinguish one medicinal plant from another, how to discriminate between good and imperfect specimens and to detect sophistications, and how to collect medicinal plants, so as to obtain them at the more valuable periods of their lives, and from the most suitable localities. Vegetable physiology makes you acquainted with the habits of plants, with the modes of their growth, the circulation of their fluids, the elaboration of their juices, the production of their fruits, the deposition of their tissues, and the secretion of their active principles. Geographical botany shows you that plants are restricted in their distribution over the earth's surface by certain irrefragable physical laws, that climate and soil exercise an irresistible influence over them, that plants which grow under one condition of climate and soil either cannot be reproduced under other circumstances, or that they may be reproduced with the same external characters, but differing in other respects from the plants as grown in their native locality; so that a fruit that is obtained from a plant grown under one class of circumstances may be edible and agreeable, whilst, if it be produced by a plant in external appearance identical, but grown in other circumstances of climate and soil, it may be nauseous and even poisonous. Botany teaches you also how to cultivate medicinal plants to the greatest advantage, the influence of the seasons, the rotation of crops, and much other important knowledge.

Medical Jurisprudence is, to a certain extent, essential, because it defines the position which you hold as, in some respects, the guardians of the public safety. To your charge are committed certain articles, popularly termed poisons, the indiscriminate sale of which would lead to deplorable results. Medical jurisprudence, in its division of toxicology, instructs you to what extent these substances may be regarded as articles of promiscuous commerce, and to what pains and penalties you would be subjected by a wilful or careless disregard of the laws relating to this department of medical police.

Materia Medica is essential, and I have placed it last in the list of essentials, not because it is least in importance, but because it is really a digest or compendium of the sciences already enumerated, in so far as they relate to medicines. It is the practical application of these sciences to the art of pharmacy, the hiving of the sweets obtained by an excursion into the floriage of the collateral sciences. The student of Materia Medica must be constantly dropping in upon his friends the chemist, the botanist, and the toxicologist, and, when he meets with anything of interest to him, he must carry it off to his own laboratory, and there endeavour to work it up into a suitable form for practical application. They are our pioneers, and we could not get on without them. But Materia Medica has another aspect, it is not only associated with pharmacy, but also with therapeutics; that is to say, on the one hand, it practically applies the sciences already enumerated to the art of pharmacy, whilst, on the other, it applies the products of pharmacy to the art of healing. Now, I think that the pharmaceutical student should also devote a little attention to the latter department of Materia Medica, as viewed from the pharmaceutical, but not from the medical side of the question. By this, I mean that the pharmaceutical student ought to be acquainted with the doses, actions, and uses of medicines so far as to be able to explain in an intelligible manner the effects to be anticipated from the employment of any medicine in a given quantity; and he ought also to be prepared to meet any emergency arising from wilful or accidental poisoning. But —and I shall return to this subject by-and-by—it is entirely beyond his province to attempt, as a profession, the application of any medicine, however simple, to any ailment however apparently trifling. Materia Medica will also teach you the practical application of chemistry and botany to the recognition, selection, collection, cultivation, preparation, preservation, testing, and so forth, of drugs. On a previous occasion I mentioned to you my views respecting the teaching of pharmacy on a more extensive basis than can be undertaken either in connection with Materia Medica, or with any of the sciences previously enumerated, and, therefore, I need not dwell upon the subject of a higher class pharmaceutical education.

I have but little to say with respect to your non-essential or optional studies; it is a question for each of you to determine for himself how he can most satisfactorily and pleasantly employ his leisure hours with the object of improving his social as well as his professional status. I may suggest, however, that, if your opportunities serve for it, you would not be the worse of knowing something about the structure and functions of the human body in health, and that a course of general descriptive anatomy, and one of physiology, might be followed with advantage as means of mental culture. As a recreative study, I would also commend to you the microscope, by means of which you can obtain both pleasure and instruction in many departments of natural science. One thing I would caution you against, namely, dabbling in the strictly medical subjects of education. When you remember that medical men of long experience are fain to exclaim, "How much still remains to be learned!" you will at once admit that your very limited opportunity of inquiry into medical subjects could only yield you an unsafe acquaintance with them, and it is quite certain that you would end in a deficiency of pharmaceutical knowledge without acquiring a proficiency in things medical.

Having at length passed through your period of study, and having become a fully qualified member of your profession, we may glance for a moment at your relations, duties, and privileges as such. Your position as a pharmaceutical chemist will depend very much upon your individual merits, but, apart from these, you are entitled, as a member of a learned society, to take rank in the assemblies of the scientific world; and the more countenance you lend, the more assistance you afford, to the Pharmaceutical Society, to your Pharmaceutical Conferences, and to your occasional local meetings, the greater will be your advancement as a body, and the more evident will be the reflex effect of this upon each of you personally. I have sometimes heard it murmured that it is of no use to belong to the Pharmaceutical Society, that it costs money, and that you derive no benefit from it. This is simply regarding your subscription to the society in the light of a tax. All taxes, regarded as such, are obnoxious, and it is not until you reflect upon the other side of the equation, and find that you are amply compensated, that you pay them cheerfully. One tax collector after another calls at your house, and you think of taxes and pay them grudgingly; but you go out of doors, and you find your streets cleaned, your lamps lighted, your house guarded, your poor fed, clothed, and housed, and your nation protected from invasion and powerful to defend every good cause, and then a gleam of satisfaction lights up your countenance as you say within yourself, I helped to do all this. So it is also with respect to learned societies they must have machinery and their mechanism must be kept employed, so that those who would support them must not only subscribe to their capital, but must also volunteer occasional services; and then, when he sees that by such means his calling is advanced and his interests are protected, that ignorance is instructed, that intolerance is restrained, that weakness is protected, and that jealousy gives place to laudable emulation, each contributor will congratulate himself upon the part which he has been privileged to perform in his own department. You take rank in social life according to your religious and moral character, and there is no better evidence of this than the company in which you are found; so also in your professional life, your success will depend very much upon your individual talents and exertions, but not a little also upon the reputation of the body to which you belong, which, if you honour and support, will, in return, shed upon you a lustre such as the world cannot fail to appreciate and respect.

It is your privilege as a Pharmaceutical Chemist, moreover, to derive from the public a substantial return not merely as a bare profit upon the drugs contained in a physician's prescription, but something more as the requital of services for the performance of which your education was in the first place expensive, and upon the performance of which you bestowed much anxious thought. For the dispensing of a prescription is not a matter of manual labour and dexterity only; there is frequently a good deal left to the judgment and taste of the dispenser, and in order to qualify himself for the fulfilment of his share in the recovery of the sick, he must, like the physician with whom he is co-operating, study day by day, independently of prescriptions, to bring his art to the highest state of perfection. And for this he should receive an adequate remuneration.

And this brings me, lastly, to the brief consideration of your relations as a Pharmaceutical Chemist, on the one hand towards the sick, and on the other towards the physician. The patient demands at your hands the means which, in the opinion of his medical adviser, are capable either of removing his disease, or at least of alleviating his distressing symptoms. When the physician has done all that lies in his power he has really done nothing at all for the relief of his patient, if medicines be necessary, until he obtains your assistance. He is like an architect, who can only put a house upon paper, and who requires the aid of the builder to give effect to his designs. Let the physician be ever so skilful and careful, all his attention will be unavailing unless he be supported by your attainments as a Pharmaceutical Chemist. If, therefore, you are careless in dispensing the prescription, or if you were to employ materials of inferior quality, you would not only be neglecting your own duty but you would frustrate the endeavours of the physician also. Mark, then, what I was almost going to term your *awful* responsibility, and let it be your fixed determination through life to discharge the functions of your important stewardship with unswerving rectitude. You can scarcely guess how many questions a medical man has to put to himself before he dares to acknowledge his belief that any improvement in his patient is due to his prescription. There are many disturbing causes of a physiological and pathological character, as well as others of an external kind, which I need not explain to you; and how very sad it would be if he were obliged to add to these others due to the culpable negligence, I will not say the dishonesty, of the dispenser. But it is also to be borne in mind that the most scrupulous Pharmaceutical Chemist may unwittingly defeat the objects of the physician by employing articles which he believes to be of the best, but which, although possessing all the external features of pure drugs, may be inert either from faulty preparation, or in consequence of the plants from which they were made having been collected at a wrong season, or from some other cause. How much, then, depends upon your skill in detecting adulterations, your persevering industry and moral rectitude in maintaining your stock at a high standard of purity, your carefulness in separating the exact quantities prescribed, and in rendering them into the required forms; in short, upon your intelligence, activity, industry, caution, and integrity! And what better proof can there be that you possess all these qualifications than that you are members of a distinguished society whose interests it should be your chief aim to promote, and whose reputation you should cherish as your own?

From what I have already said you will also gather some ideas of your relationship to the medical profession. I would earnestly recommend you to cultivate a good feeling towards medical men; for although, as I have said at the outset, I am not speaking in the name of the profession, still I can venture to affirm that the wish of every physician is to see the Pharmaceutical Chemist placed in such a position that there can be no reasonable doubt of his fitness for his responsible duties. And when I say this, you must not misunderstand me, by supposing that I am blind to the merits and proficiency of very many representatives of your profession; far from that, your calling is adorned by many illustrious names, and all that can be desired in addition is, that the very name of Pharmaceutical Chemist shall become a sufficient guarantee for the intelligence and respectability of every recipient of the title.

In a previous address, which I delivered to the Society, you will find the following passage:—"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." I was then, of course, speaking to the rule, and did not doubt that it had many exceptions; but as I am now inviting your attention to the relationship existing between the physician and the pharmaceutist, perhaps you will kindly bear with me whilst I endeavour, very briefly, to point out the line of distinction between their several functions. It is the duty and privilege of the Pharmaceutical Chemist to prepare and supply the medicines prescribed by the physician, and I am quite of opinion that he ought to be protected in these. The medical practitioner has enough to do in studying the nature and treatment of his cases, without the additional labour of dispensing medicines; but that is not the only point from which to look at the subject, for it is also true that the busy medical practitioner is unfit for the duties of a dispenser, in so much as he has not the requisite leisure to bestow in order to keep himself abreast of advancing pharmacy. What he is chiefly concerned with is the therapeutical properties of those drugs which he looks to the Pharmaceutical Chemist to place in his hands; and if to the latter falls all the labour and anxiety of producing medicines in their purest and most eligible form, to him also should be conceded the commerce by which alone he can be adequately remunerated. I am not for a moment supposing that the medical practitioner is destitute of pharmaceutical knowledge; that would be to say that he could not write a prescription, and would render him unfit for his duties as a physician; but he must necessarily look to the Pharmaceutist for that acquaintance with the daily improvements in the art of pharmacy which he has not the opportunity of prosecuting for himself. There is now, I think, a very general feeling that all medical practitioners should be remunerated by fees paid in consideration of their professional attendance, and not by a profit upon drugs; and it is of the utmost importance to the patient that the judgment of his adviser should in no way be biased by a prospect of gain in proportion to the amount of medicine swallowed. For the same reason all private arrangements whereby a medical practitioner receives from the Pharmaceutist recommended by him a percentage upon the value of medicines supplied in accordance with his prescriptions, are highly objectionable. To the pharmaceutist, therefore, as a rule, the prescription in its commercial aspect should entirely be left; but, and this it is important to bear in mind, there are circumstances in which it is imperative upon the medical practitioner to supply the means of carrying out his own instructions. This is especially the case in country districts, where there is not occupation sufficient to support a respectable Pharmaceutical Chemist. In all attempts at legislation, therefore, it behoves the Pharmaceutical Society to be tender of the privileges of the medical profession; for although it may be desirable in large towns that the dispensing of prescriptions should be conceded to the Pharmaceutist, yet not even there should there be any legislative interference with the complete freedom of the medical practitioner.

Then, on the other hand, the functions of the medical practitioner are not to be usurped by the Pharmaceutist, and it is no part of the duty of the latter to advise the patient. He is prohibited, in the first place by the spirit of the law, and in the second by his own incapacity. The letter of the law is, that any person pretending that he is a legally qualified medical practitioner who is not such, renders himself liable to a heavy penalty; and the spirit of the law is, that none but legally qualified medical practitioners shall give advice for the treatment of disease. But even if he were disposed to evade the law, the Pharmaceutist is incapable of treating disease; he is qualified neither by scientific nor practical education to elicit from the patient that information which alone could enable him to understand the nature of the case, and upon the correct interpretation of which alone he could found a scientific or rational plan of treatment. No disease is simple enough for his management, because he is unable to test the condition of the various organs, so as to ascertain how far the apparently simple external phenomena are associated with graver internal complications, and, therefore, he would be doing the patient a grievous injury by trifling away precious time, at a season when if the commencement of serious disease were detected, it might still be averted. One thing is quite certain, that the more highly the Pharmaceutical Chemist is educated, and the more studious he is in his own calling, the less likely will he be to interfere with matters of which, simply from lack of time and opportunity to inquire into, he is incompetent to treat. Ignorance alone could induce him to attempt those duties in the performance of which the Physician finds even a lifetime too short to be instructed.

It is plain, therefore, that whilst the medical practitioner and the Pharmaceutical Chemist are associated in the treatment of disease, each has his own part to perform, and it is not only to their mutual advantage, but eminently to the interest of the patient, that they should cultivate a kindly feeling towards each other, and that each should sustain the dignity, and advance the knowledge, of his own department. It is because I feel a great interest in the welfare of the Pharmaceutical Society that I have ventured to be thus explicit upon a point which has been heretofore, and might again become the means of preventing that unbroken harmony which it is so desirable to maintain; and it is extremely important that you, Gentlemen, who are now setting out upon the voyage of your professional life, should not only be well instructed in all those matters which will enable you to pursue your course prosperously, but also that you should be cautioned against those rocks and whirlpools which, if encountered, whether unwarily or wilfully, would be apt to make shipwreck of your adventure.

In conclusion, Gentlemen, let me say one word about those things which are of infinitely greater importance than the applause of men or the uninterrupted prosperity of your earthly career. It would be a sorry ending to a diligent and useful life to have no better reward than the mingled chaplet of thorns and laurels which men can put upon your brows; it would be a dark evening of your days if you had no inheritance beyond the perishing things of time. Look to it, therefore, that you do not let the labours and anxieties of your professional calling choke the better part of your nature. Be sober, be vigilant, remembering who is your adversary. Be courageous, be faithful, be grateful, remembering who has given you all your good things, and that He is sufficient for all things. Cast all your cares upon Him, for He careth for you.

At the close of this address there was considerable discussion on some of the points mentioned, in which Mr. D. R. Brown, Mr. Nicol, Dr. James Young, and Mr. Mackay took part.

A vote of thanks was, on the motion of Mr. Brown, awarded unanimously and with acclamation, to Dr. Jackson, for his interesting communication.

A note was then read by the Secretary from Dr. Stevenson Macadam, explaining his absence from the meeting in consequence of the unexpected death of his brother, and thereafter, read the following communication from Dr. Macadam "On the Poisonous Nature of the Ingredients in Pharaoh's Serpents:"—

"The chemical toy which is now sold largely in many shops in this city, at prices ranging from threepence to one shilling each, is composed of a highly dangerous and poisonous substance called the sulphocyanide of mercury. The material is a double-headed poisoned arrow, for it contains two poisonous ingredients, viz. mercury and sulphocyanic acid, either of which will kill. Experiments have been made by me upon the lower animals, and I have found that one-half of a sixpenny Pharaoh's serpent is sufficient to poison a large-sized rabbit in an hour and three-quarters. A less dose also destroys life, but takes longer to do so. The toy, therefore, is much too deadly to be regarded as merely amusing; and seeing that it can be purchased by every schoolboy, and be brought home to the nursery, it is rather alarming to think that there is enough of the poison in one of the serpents to destroy the life of several children. And the more so, that the so-called Pharaoh's serpent is covered with bright tinfoil, and much resembles, in outward appearance, a piece of chocolate, or a comfit. I hope that the rage for the Pharaoh's serpents will die out in Edinburgh without any disastrous consequences, though such have occurred in other places; but it is certainly an anomaly in the law of the kingdom that a grain of arsenic cannot be purchased except under proper restrictions, and that such articles as Pharaoh's serpents, containing as deadly a poison, may be sold in any quantity, and be purchased by any schoolboy or child."

Mr. Hopwood, one of Dr. Macadam's assistants, was present, and read some interesting details regarding the poisonous effects of the sulphocyanide of mercury on some of the lower animals. He further stated that more extended experiments were about to be carried out, when the result would be made known to the Society. Thanks were unanimously accorded to Dr. Macadam for his communication.

Specimens of the seeds, cake, and oil, of the *Argemone Mexicana* were then submitted. These were presented by Messrs. Morson and Son, of 19, Southampton Row, London.

The Secretary drew the attention of the meeting to the fact, that the properties of this oil had already been noticed in the Pharmaceutical Journal, vol. iv. p. 167, vol. xii. p. 292, and vol. xiii. p. 642. He also mentioned, that Messrs. Morson were now prepared to supply the oil as an article of commerce.

Dr. J. Argyle Robertson, who was present, made the following observations:—

He remarked that about two years ago he had received from Dr. Andrew Inglis a sample of the resin of the *Argemone Mexicana*, with the information that it was much employed by the native oculists in India as a local application in cases of external inflammation of the eye. The preparation he was recommended to employ was made by dissolving some of the powdered resin in an equal part of glycerine, whereby a dark-brown oily liquid was obtained. He had employed it to a considerable extent in inflammations of the conjunctiva, and views it as an excellent astringent. Dr. Robertson was of opinion that the great class of washes and lotions, which were denominated "stimulant-astringents," should be divided into two groups—the one possessing purely astringent qualities, the other possessing stimulant properties as well. Many cases of conjunctivitis occur, in which the application of a moderately strong solution of sulphate of zinc, alum, or sulphate of copper was productive of injurious rather than beneficial effect, and in which lotions of acetate of lead or other pure astringent would effect a rapid cure. He was thus led to divide the class of stimulant-astringents into the two above-indicated groups. He found that the *Argemone Mexicana* was more especially useful in the acute and irritable forms of inflammation of the conjunctiva, and was therefore inclined to regard it as a good pure astringent. Dr. Inglis had also informed him that he had used the argemone in all the external inflammatory affections of the eye that he had met with, and with excellent results. The particular affections in which Dr. Robertson had found it most applicable were the catarrhal ophthalmiæ.

Thanks were voted to Messrs. Morson and Son for their donation to the museum. The meeting thereupon adjourned.

BIRMINGHAM CHEMISTS' ASSOCIATION.

An attempt has been made in Birmingham, since the meetings of the Pharmaceutical Conference were held in that town, to perpetuate the local interest created by the Conference, in the establishment of a more permanent scientific and commercial association, embracing the four midland counties of Warwick, Worcester, Stafford, and Shropshire. The Committee, who worked so actively and successfully on that occasion, issued two hundred and forty-five printed notices, to a portion of the chemists of these counties, with a view of ascertaining what amount of success they were likely to meet with; but of this number fifty replies have been received, and twenty-six only have signified their willingness to take part in the project. The Committee, therefore, have determined to discontinue any further efforts to promote the Association at present. We need scarcely say that we regret that this Association, intended to be in friendly alliance with the Pharmaceutical Society and other bodies connected with the trade, should have met with such little support as to necessitate so early a termination.

ORIGINAL AND EXTRACTED ARTICLES.

DETECTION OF METHYLIC ALCOHOL.

BY MR. JOHN T. MILLER.

The following modification of my process for the detection of methylic alcohol may be used when it is wished to avoid distillation. It is easy of execution, and gives very fair results.

Prepare in a small flask an oxidizing solution with 20 grains of bichromate of potash, 3 fluid drachms of water, and 20 minims of strong sulphuric acid, and add to it 30 minims of the spirit to be tested. After the mixture has stood ten minutes, add just enough milk of lime to give it an alkaline reaction; warm, filter, and wash with half an ounce of warm water. The filtrate will be free from chromic oxide, and the greater part of the sulphuric acid. Precipitate the remainder of the latter, and any chromic acid which may be present, by the addition in small excess of a strong solution of acetate of lead; warm slightly, allow a few moments for the precipitate to subside, and filter. The filtrate should now be clear, colourless, and nearly neutral to test-paper. Boil it quickly down to 2 fluid drachms, pour it into an ounce test-tube, add 1 drop of dilute acetic acid (1 part of the B. P. acid to 2 parts water), and 1 grain of nitrate of silver in 30 minims of water; then heat the liquor slowly to the boiling-point, and *simmer* two or three minutes. Darkening of the solution to a considerable degree may occur even though the spirit be free from methylic alcohol, and is therefore a less reliable indication of the presence of that substance than when the oxidation products have been separated by distillation. The state of the test-tube will, however, decide the question. It should be rinsed out, filled with water, and placed against white paper. If it appear clean and uncoloured, the spirit is either pure, or contains less than 2 per cent. of methylic alcohol; if, on the other hand, the lower part of the tube have an evident brown tint, the spirit is methylated.

To obtain satisfactory results by this process, the points to be minded are:— 1. To use distilled water. 2. To add only a slight excess of the precipitants. 3. To use a perfectly clean test-tube. 4. To avoid boiling the liquor up the tube, and so thinning the metallic deposit by spreading it over a larger surface.

I have tried various oxidizing agents, but have found none better or more manageable than bichromate of potash.

Sheffield, November 9th, 1865.

IS CHLORODYNE SUBJECT TO A MEDICINE STAMP?

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Having asked various friends about the custom and the legality of selling Chlorodyne without a Government Stamp, and having failed to obtain conclusive information, even from the proprietor of the article, I addressed a letter to the Board of Inland Revenue upon the subject, which, together with their reply, I now beg to lay before your readers.

BARNARD S. PROCTOR.

Grey Street, Newcastle, Nov. 24, 1865.

"*Grey Street, Newcastle, October* 31, 1865.

"*To the Honourable Commissioners of Inland Revenue.*

"Gentlemen,—You will greatly oblige if you can inform me,

"1. If Chlorodyne bearing the accompanying wrapper* is subject to stamp duty when sold retail.

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* The wrapper supplied was the usual wrapper of Collis Brown's Chlorodyne.

"2. If so, whether it requires a stamp when sold to a Surgeon or Druggist for use in dispensing.

"If the second answer is affirmative—

"3. If I render myself liable to penalty by buying it without a stamp, and stamping it before selling it again.

"4. Also if it can be supplied without a stamp when ordered mixed, or unmixed in the prescriptions of qualified medical practitioners, the instructions accompanying it being only such as the medical practitioner supplies.

"Yours most respectfully,
"BARNARD S. PROCTOR."

(COPY.)

Inland Revenue, Somerset House, London, W.C.
23rd November, 1865.

"Sir,—I have laid before the Board of Inland Revenue, your letter of the 31st ulto., and in reply to the questions therein contained I am directed to state:—

"I. That the article Chlorodyne, as sold with the wrapper enclosed by you, is liable to stamp duty when sold by retail, and

"II. Is so liable whether sold to a Surgeon, Druggist, or other person.

"III. That the second section of the Act 43 Geo. III. cap. 73, the provisions of which are kept in force by the eighth section of the 44 Geo. III. cap. 98, imposes a penalty of £20 on a person who shall receive an article subject to duty without a Label, and not inform the Commissioners of Inland Revenue within ten days.

"With reference to the last question in your letter, as to the sale of Chlorodyne, mixed or unmixed, as prescribed by medical practitioners, the Board cannot advise without being further informed of the way in which it is proposed to sell the same.

"If the preparation in question, with a paper showing the instructions issued therewith be sent here, the Board will make a further communication to you in the matter.

"I am, Sir, your obedient servant,
"*Mr. B. S. Proctor.* "T. SARGENT."

THE NEW EDITION OF THE BRITISH PHARMACOPŒIA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Observing the suggestions made by a "dispenser" respecting the new edition of the Pharmacopœia, may I draw attention to the following objectionable, nay, dangerous alteration in the nomenclature of "Hydrarg. Bichlor. P. L." The new name, "Hydrarg. Corrosivum Sublimatum," is not only inconvenient, but, like "Calomelas," too public. The achievements of the prescriber are often frustrated, because a nervous patient privately objects to take *mercury;* then again, if we adopt the only alternative, "Hydrarg. Chlor.," it is really dangerous, and will sooner or later lead to a fatal mistake. For instance, an apprentice enters the profession, and, if we may rely upon the integrity of his master, he is brought up in the rudiments of the British Pharmacopœia; he is there taught that "Hydr. Chlor." means "Hydr. Corrosivum Sublimatum," etc., and altogether he has made such fair progress as to enable him to dispense a prescription *mechanically*. Enters presently (probably during the unavoidable absence of the master or assistant) a blustering bachelor with a "funny fancy for his favourite physic;" his time-worn prescription, tracing its origin so far back as the palmy days of the P. L., is presented; his pills "Hydr. Chlor. etc." are prepared by this exulting young dispenser: a coroner's inquest is the inevitable result, and the aspiring youth is "hauled up," and if so fortunate as to escape a verdict of manslaughter, he is severely censured for the extraordinary crime of being an accurate dispenser, and a startling announcement of "another case of accidental poisoning by a chemist," adds another to the already augmented list. Apologizing for thus intruding upon your valuable space, I am, yours truly,

T. C. JONES.

121, *Grove Street, Liverpool.*

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—I do not think I am the only one of the Pharmaceutical Druggists that would endorse the remarks made by a Dispenser in the last October Journal, with reference to the present B. P. The book appears to me to be neither one thing nor the other (perhaps it is the happy medium), it is neither in Latin nor English, but a little of each. Nor does it give us the forms for all the preparations which a druggist is obliged to keep. In addition to the omissions mentioned by "Dispenser," why are the tinctures of quassia, aloes co., guaiaci, iodi, rhei, syr. croci, and many others omitted? some of which are daily prescribed. As to syr. croci, you find it oftener in prescriptions than any other syrup except syrupus aurantii. Which of the three rhubarbs are we to use in making its preparations? Why particularize aloes? We can *guess* the one as well as the other. In some tinctures leaves are specified; in others, though made with the leaf, it is omitted. These little, but I think important, details should not be overlooked in the new edition, if one uniform strength of medicines is wished for. The present B. P. is of little use to the dispenser. To the druggist who makes some of the preparations it is of use, as the forms for such are in quantities suitable for the retailer. The Materia Medica and Appendix are good additions, and of great use to the *chemist*, but I think that part is not often referred to by the greater portion of the druggists; therefore the laboratory is its fittest place, as it is not the *complete* work the retail druggist requires. Therefore it is to be hoped in the new edition we shall have one of use to the apprentice as well as the laboratory man; one in which can be seen at a glance the whole of the preparations in use (or at least such as are recognised by the medical profession), with their processes, their medicinal properties and uses, their characters and tests, their doses and antidotes; and let *simple* preparations be styled as such, and *compounds* as such. Again, why are the present rising generation of druggists to study Latin and undergo examinations in translating Latin prescriptions and passages in Ovid, Cæsar, etc. etc., if the B. P. is to be printed in English, symbols to be done away with, and prescriptions as well as the directions to be written in English? But presuming the compilers of the B. P. have not that idea in view, I agree with "Dispenser" in having the new edition greatly enlarged, printed in Latin, and with the well-known symbols as before, so that our young men may in their daily work find it to be a stepping-stone to their studies, as well as useful to a

COUNTRY DRUGGIST.

November 9th, 1865.

PREVENTION OF ERRORS IN DISPENSING.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—As any scheme that will tend to afford security against errors in dispensing, cannot but be of interest to chemists, perhaps you may think this communication not out of place in your journal.

In many instances mistakes have arisen from the dispenser being unable to see the whole of the label at a glance, which it is impossible to do when the bottles are labelled in the usual manner. Thus, in the hurry of business, a not too careful dispenser might mistake "Lin. Camph. Co." for "Tinct. Camph. Co.," "Pulv. Ipecac. Co." for "Pulv. Ipecac. Sx.," or "Oxymel Simplex" for "Oxymel Scillæ"; "cum multis aliis, et id genus omne."

So well recognised is this fact, that numerous methods have been tried to remedy the evil; some inefficient, some unsightly, and most of them expensive.

I have just had my shop relabelled after an idea of my own, which, as far as I can learn, has not as yet been tried. It is not very expensive; the whole of the label can be seen without turning the bottle round; and the appearance is certainly pleasing.

The label is in form a long oval, the long diameter pointing directly upwards and downwards; the middle is gilt, with an internal red border and an external black one; and the writing is in the Egyptian character.

I shall be very happy to show any of your readers who are passing 202, Gray's Inn Road, how it looks. I am, Sir, yours obediently,

W. L. Shephard.

202, *Gray's Inn Road, November* 16*th*, 1865.

PUFFING ADVERTISEMENTS.—BAKING POWDERS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Seeing the article headed "Mendacious Puffing" in your Journal for November, it has occurred to me to ask you to do me the favour of inserting a few remarks on the subject.

There is a description of dishonesty in trade more subtle and more difficult to bring home to the crafty dealer, than the more palpable wrong of selling adulterated articles; I allude to the practice of puffing off certain compounds as containing qualities which they do not possess; this is particularly the case with respect to "baking powders." From the advertisements put forward concerning them, it might be supposed that they could adequately supply the place of butter and eggs in our pastry and puddings, and that a great saving would be the result of their employment for those purposes. This idea is altogether delusive, and it is quite right that the true value of the commodity as a dietetic agent should be properly estimated by the public.

About two years ago the result of a chemical analysis of these powders was published in the 'Lancet;' it was ascertained that they are for the most part composed of carbonate of soda and tartaric acid, combined with a small proportion of rice flour; this is the description of the powders when unadulterated and in the least objectionable form.

Now it cannot be denied that such a compound may be used with advantage in the preparation of pastry, *in addition to the ordinary ingredients*; for the chemical effect of the powder referred to would be to render pastry more light and digestible, by neutralizing the tendency of the butter to turn rancid under the action of heat, to which it is subjected during the process of baking; but such powders cannot effect a saving of butter by being substituted for it, nor can "egg-powders" supply the place of eggs in children's puddings; for besides the absence of any nutritious element whatever in these powders, rendering their employment objectionable, they are frequently positively pernicious, from the fact that the colouring matter found in them is supplied by the introduction of *chromate of lead*.

Whether "baking powders" can with advantage be employed in the place of yeast in the making of bread, I am not prepared to say; but as *German yeast* is used in the Queen's bakeries, and no other preparation of the kind is authorized in the Royal household, the statement put forward in some of the advertisements relating to the baking powder, to the effect that it is "recommended by the Queen's baker," is intended to imply more than the facts justify.

But my remarks have chiefly to do with the part these "pudding and egg powders" play in the daily food of little children. It is a matter of more consequence than may appear at first sight; obscure cases of illness sometimes arise, especially in the attacks of infancy, and some important light may be thrown upon such cases by inquiring into the nature of the food partaken of; and with these powders in view, a different meaning than heretofore may attach to an inquiry of the kind.

The consideration which was prominent in my mind in addressing you was this,—that although these baking powders may be quite innocuous in themselves—perfectly free from an admixture of anything which could bring them under the charge of being adulterated—still a great wrong may be inflicted upon the public by the pretence that these compounds possess qualities which they do not contain, and although they may be used with advantage in the manner which I have indicated, yet abuses in their employment must be guarded against, for to depend upon such an ingredient, as containing the nutriment necessary for children, to the exclusion of the proper elements from their daily food, would lead to the most disastrous results, all the more serious because the true cause of the ailments incurred, might remain altogether unsuspected.

I am, Sir, yours obediently, SANITAS.

EXTRACT OF MEAT FROM JERKED BEEF.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—At the close of a discussion on Extract of Meat, delivered by Mr. H. B. Brady, at the meeting of the British Pharmaceutical Conference, Mr. Atkin inquired if the extract might not be prepared from jerked beef? Having some time since made a number of experiments in this direction, I have come to the conclusion that it *cannot* be well prepared from this source. There are three forms in which jerked beef has been imported—1st, resembling a piece of mahogany, having been subjected to heavy pressure and dried; 2ndly, as corned beef, having been soaked for a short time in brine, and packed in the hold of the vessel, with the further addition of dry salt; and 3rdly, in bales, surrounded by canvas, having been salted and subjected to a moderate pressure. The first of these is not now procurable, but the two latter are being sold in good condition (as also pressed mutton); they contain, however, from 13 to 16 per cent. of salt, 14 per cent. being the average amount in the unpressed beef, and this is the kind which would be most likely to yield a good extract, as during pressure of the other kinds a portion of the lacteal and lymphatic fluids is necessarily lost.

To obtain the extract, I cut small a quantity of the unpressed salt beef, soaked it for a short time in eight times its weight of cold water, then heated the whole in a water bath near to boiling for an hour, removing any fat or albumen on its cooling, then strained off the liquor with slight pressure of the dregs, further concentrated the former, separated the salt by dialysis, and finally evaporated in a water bath to a proper consistence. It smelt *good*, but was not full-flavoured as the extract prepared from fresh meat, and in addition had a peculiar somewhat bitter taste, arising probably from some action of the salt on the meat during its transit. The experiments were repeated and varied, but with much the same results.

The removal of *albumen* appears to be a very necessary part of the operation; its presence would in all probability prove prejudicial to the keeping qualities of the extract, and the latter would not be entirely soluble in boiling water.

Liebig's extract of meat, although highly nutritious, contains neither albumen, gelatine, nor fat. Faithfully yours, CHARLES SYMES.

Oxton Road, Birkenhead, October 11, 1865.

ON THE NUTRITIVE VALUE OF "EXTRACTUM CARNIS."

BY JUSTUS LIEBIG.

I see that rather contradictory views are expressed by different English writers on the value of the Extract of Meat, some taking it to be a complete and compendious substitute for meat, whilst others assert that it has no nutritive value whatever. The truth, as is usually the case, lies in the middle; and as I was the first who entered more fully into the chemistry of meat, I may be allowed shortly to state the results of my investigations, as far as the Extractum Carnis as a nutriment is concerned.

Meat, as it comes from the butcher, contains two different series of compounds. The first consist of the so-called *albuminous* principles (*i. e.* fibrin and albumen) and of glue-forming membranes. Of these, fibrin and albumen have a high nutritive value, although not if taken by themselves. The second series consists of crystallizable substances—viz. creatin, creatinin, sarcin, which are exclusively to be found in meat; further, of non-crystallizable organic principles and of salts (phosphate and chloride of potassium). All of these together are called the *extractives of meat.* To this second series of substances beef-tea owes its flavour and efficacy; the same being the case with Extractum Carnis, which is, in fact, nothing but solid beef-tea—that is, beef-tea from which the water has been evaporated. Besides the substances already mentioned, meat contains, as a non-essential constituent, a varying amount of fat. Now, *neither fibrin nor albumen* is to be found in the Extractum Carnis which bears my name; and gelatine (glue) and fat are purposely excluded from it. In the preparation of the extract the albuminous principles are left in the residue. This residue, by the separation of all soluble principles, which are taken up in the extract, loses its nutritive power, and cannot be made an article of trade in any palatable form. Were it possible to furnish the market at a reasonable price with a preparation of meat, combining in itself the albuminous together with the extractive principles, such a preparation would have to be preferred to the Extractum Carnis, for it would contain *all* the nutritive constituents of meat. But there is, I think, no prospect of this being realized. Happily the albuminous principles wanting in the extract of meat can be replaced by identical ones derived from the vegetable kingdom *at a much lower price.* Just the reverse is the case in regard to the *extractive* matters of meat, for (their salts excepted) it is impossible to find any substitute for them. On the other hand, they may be extracted from the meat and brought into the market in a palatable and durable form. In conjunction with albuminous principles of vegetable origin they have the full nutritive effect of meat. From the extractive matters, then, contained in Extractum Carnis in a concentrated form, the latter derives its value as a nutriment for the nations of Europe, provided it can be produced in large quantities and at a cheap rate, from countries where meat has no value.

The albuminous principles of vegetable origin are principally to be found in the seeds of cereals, and the European markets are sufficiently provided with them. On the other hand, the supply of fresh meat is insufficient, and this will get worse as the population increases. For an army, for example, it will not be difficult to provide and store up the necessary amount of grain or flour. Sugar, too, as well as fatty substances and the like, will be procurable, their transport and preservation offering scarcely any difficulty. But there may easily occur a deficiency of fresh meat. Salted meat but inadequately replaces fresh meat, because in the process of salting a large quantity of the extractive principles of the meat are lost; besides, it is well known that those who live on salt meat for a continuance become subject to different diseases. Dried meat generally means tainted meat scarcely eatable. Extractum Carnis, combined with vegetable albumen, enable us to make up the deficiency: and that combination is the only one at our disposal. What was said of an army also holds good of those European nations in general that do not produce a sufficiency of meat. By making the most of the herds of South America and Australia, in using them for the preparation of Extractum Carnis, and by the importation of corn from the West of United States and other corn-growing countries, the deficiency may be made up, although not to the full extent. For, supposing ten manufactories, producing together ten millions of pounds of extract of meat, from a million oxen or ten millions of sheep, that whole quantity would provide the population of Great Britain only with *one pound yearly* for every *three persons*—that is, *one* pound a day for every 1100 persons.

I have before stated, that in preparing the extract of meat, the albuminous principles remain in the residue; they are lost for the nutrition, and this certainly is a great disadvantage. It may, however, be foreseen that industrial ingenuity will take hold of this problem and solve it, perhaps by a circuitous road. For if this residue, together with the bones of the slaughtered beasts, be applied to our fields as manure, the farmer will be enabled to produce a corresponding quantity of albuminous principles, and to better supply our towns with them, either in the shape of corn or of meat and milk. Made into a marketable state it may hereafter replace the Peruvian guano, which very soon will disappear from the market.

On the value of extract of meat, as a medicinal substance, it is unnecessary to say a word, it being identical with beef-tea, about the usefulness and efficacy of which opinions do not differ. At the same time I may remark that it is a mistake to think that beef-tea contains any albumen—that there ought to be any gelatine or drops of fat to swim on its surface. Beef-tea does not contain any albumen, and, if rightly prepared, ought to be free from gelatine (or glue), whilst the supernatant drops of fat form a non-essential and, for many, an unwelcome addition.

I should be glad if these lines could assist in clearing up public opinion on the value of extract of meat as a nutriment: my aim being, on the one hand, to reduce to their right limit hopes too sanguine; on the other, to point out the true share which the extract of meat can have in the nutrition of the people of Europe. In doing this, I know full well, that whatever may be said for its recommendation would be in vain, if the extract of meat did not supply a public and generally-felt necessity, and if it could not stand the test of our natural instinct—a judge not to be bribed.—*The Lancet.*

PARRISH'S SYRUP OF PHOSPHATES.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In a passing allusion which I made to the above preparation before the Liverpool Chemists' Association (Pharm. Journ., Nov. 1, 1865) I inadvertently said that no iron phosphate was contained in it. It did not occur to me till too late for correction that the one described was his Syrup of *Hypophosphites*, and not the former.

I am, Sir, yours, etc.,

Liverpool, November 1, 1865. A. Redford.

THE YELLOW AMORPHOUS OXIDE OF MERCURY AND ITS APPLICATION IN CONJUNCTIVITIS AND CORNEITIS PHLYCTENULOSA.*

BY DR. PAGENSTECHER, OF WIESBADEN.

The following is taken from a paper by Drs. Pagenstecher and Hoffmann in the 'Ophthalmic Review' of July, 1865:—

Two forms of oxide of mercury are recognized:—

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* *Vide* Pharm. Journ. Vol. IV. (2nd series) p. 512,—a paper by Mr. Balmanno Squire, who was the first to recommend this preparation.

1st. The crystalline, or red oxide, prepared by the dry method, and commonly known as red precipitate, constituting the very common remedy; and

2nd. The amorphous, or yellow oxide, prepared by the wet method by precipitation; up to within a few years unknown to the pharmacopœia, although it is indubitably preferable to the first.

The common red precipitate is rendered applicable to practice by being triturated in a porcelain mortar till no more brilliant crystalline points can be perceived: a powder is thus obtained, which is quite soft, and when rubbed between the fingers no longer imparts any gritty feel. If this, after being prepared in the most careful possible way, is submitted to the microscope, it may, under a magnifying power of even 120 diameters, be recognized as a mass of broken crystals. The point up to which the trituration should be continued, which forms the measure of the fineness of the division, is in this method uncertain and inconstant. Thus this preparation occurs in different degrees of fineness in different shops; and as its efficacy is intimately connected with its fineness, the surgeon gets preparations which act with unequal strength.

For obtaining, therefore, a preparation uniform in its effects, and in the finest possible state of division, the yellow precipitate, which is thrown down, is highly to be recommended. Thinking this would also prove a far more energetic preparation, I, in 1856 for the first time, prepared some, and recommended its use to Dr. Pagenstecher in his eye-practice, instead of the common precipitate, and found my anticipation most gratifyingly confirmed. The mode of preparing the yellow precipitate, although well known, may be still worth mentioning. Care must be taken in the precipitation to obtain a pure oxide, and not any of its compounds, to which precipitates of mercury have a great tendency—a fact which might detract from the efficacy of the preparation. The precipitation is effected by adding a solution of the chloride of mercury to a solution of potash, in such a way that there is always an excess of the latter. After the precipitate has deposited itself, the supernatant fluid is at once poured off, the precipitate thoroughly washed with distilled water, and dried by a gentle heat, with exclusion of daylight. Thus prepared, the yellow precipitate has a light-yellow (that of the yolk of egg) colour, and is exceedingly fine powder, which, even under the microscope, appears completely amorphous. In addition to both the above-signalized properties, it differs from the ordinary precipitate in its chemical behaviour, being much more quickly acted on by reagents. A solution of oxalic acid, which acts on the red oxide only after boiling, very quickly changes the yellow oxide, even at the ordinary temperature, into the white oxalate. The preparation of hypochloric acid gas depends on the property the yellow oxide of mercury possesses of decomposing in contact with chlorine gas; the results being hypochloric acid and chloride of mercury; whereas the red oxide undergoes, with chlorine gas at the ordinary temperature, hardly any change. This difference of chemical behaviour of the two oxides constitutes a different degree of resistance to the various agents they are submitted to, and is explained by their different states of cohesion. In respect to the use of the yellow precipitate for eye-ointments, I may be allowed to say a few words on the vehicle of the ointment. The most perfect vehicle for an eye-ointment must be very soft, without, however, being too fluid, lest the heavy oxide sink to the bottom; but when in contact with a moderate heat of the body, it must completely melt, so that the preparation it contains may become quickly and uniformly diffused over the eye. Besides this peculiarity of consistence, the vehicle must be, as far as possible, indifferent in its behaviour to the oxide, and exhibit the least possible tendency to rancidity, which might exert a deoxidizing, reducing action on the oxide. Numerous experiments with hog's-lard, butter, glycerine, glycerine ointment, and mixed fats, have led me to give the preference to the last; and I recommend either the mixture of spermaceti, wax, almond-oil, and rose-water, known as "cold cream," only omitting the water, as this favours rancidity, and substituting for it quantities of almond-oil, varying according to the heat of the weather; or a mixture of butter, of cocoa, and almond-oil, likewise proportionate to the temperature. In both compounds the almond-oil must be as fresh as possible, and had best be prepared by the apothecary himself.*

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* As regards the strength of the ointment, I generally use one drachm of oxide to one ounce of fat. This may appear very strong to some, but experience amply shows that, applied in proper cases, it does not in any way irritate too much. Idiosyncrasies may, of course, be observed, as in every remedy; and if the ointment in a given case irritates too much, its strength may be reduced to 30 grs. of oxide to the ounce. I may further remark,

CAUSE OF THE SOLIDIFICATION OF BALSAM OF COPAIBA BY LIME AND MAGNESIA.

BY M. ROUSSIN.*

The cause of the solidification of balsam of copaiba has been until now either unknown or unappreciated. We know, for example, that genuine balsams of the best quality often resist solidification, whilst products of a very doubtful quality rapidly solidify. The following experiments, selected from a larger series, seem to throw some light upon the question.

If balsam of copaiba of the very finest quality is mixed with a twelfth part of its weight of quicklime reduced to a very fine powder, (it is necessary to employ rich lime,) no sign of solidification takes place, and the substances might remain in contact for any length of time without undergoing any combination. If, into such a liquid combination, enough water to hydrate the quicklime is incorporated by agitation, the temperature becomes considerably raised, and in a few hours the entire mass solidifies into a very homogeneous pill-like consistence. The proportion of water required is almost exactly a third of the lime employed.

On repeating the previous experiment with ordinary calcined magnesia, M. Roussin established,—1. That divers commercial balsams of copaiba contain a considerable proportion of water, which they will lose if exposed for a long time under a glass receiver, enclosing fragments of chloride of calcium or of carbonate of potash. 2. That the commercial calcined magnesia readily attracts the moisture of the air, and, after having been some time in a badly-stopped vessel, always contains considerable quantities of water, sometimes to the extent of 15 and 20 per cent.

If a specimen of good balsam of copaiba is divided into two equal parts, and having properly dried the first portion under a receiver, and sufficiently hydrated the other by placing it in a damp vessel, each portion is then mixed with one-sixteenth its weight of recently calcined magnesia, the dried portion remains liquid, and the magnesia in great part even sinks to the bottom of the vessel, while the second portion, on the contrary, becomes a hard mass of pilular consistence.

The above facts show the necessity of the agency of water in order to bring about the combination of the resin of the balsam of copaiba with the lime and the magnesia. M. Roussin purposes to develope these results in a more extended investigation.—*Chemical News.*

ON THE PRESENT STATE OF THE CHEMISTRY OF GAS-LIGHTING.

BY HENRY LETHEBY, ESQ., M.B., ETC.

Delivered at Birmingham before the Society of Gas Engineers.

(*Continued from page* 288.)

In order that the leading properties of the several combustible constituents of coal gas may be seen at a glance, I will direct your attention to this diagram, where I have tabulated not only the known constituents of gas, but also some of their allies, as the al-

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the two constituents of the ointment must be rubbed up to a most intimate admixture, if it is to act well. The following are, then, the two formulæ :—

℞ Hydrarg. oxydat. flavi, gr. xxx.
(via humida parati).
Ung. cetacei, ℥ss.
Misce exactissime et fiat unguent.

Or, ℞ Hydrarg. oxydat. flavi, gr. xxx.
(via humida parati).
Ung. cetacei, ℥j.
M. exactiss. et fiat unguent.

* 'Journal de Pharmacie et de Chimie,' April, 1865.

cohol radicals, as they are sometimes called, which occupy an intermediate place between the marsh gas and the olefiant gas series of compounds. You will here see how in each series the proportions of carbon and hydrogen progressively increase in the same volume of gas or vapour, and how also the specific gravity of the gas likewise increases; and so also does its illuminating power, and its vitiating effect on the atmosphere. In this last respect, I have considered that 4 per cent. of carbonic acid in the air renders it irrespirable. You will also note the proportions in which the several compounds are absorbed by water.

Constituents of Coal Gas and their Allies.

Name.		Symbol or Formula.	1 Volume contains		Specific Gravity of Gas or Vapour.	Weight of a Cubic Foot (Grains).	Volumes Soluble in 100 Vols. of Water.	Volumes of Oxygen to burn.	Product of 1 Volume.		Volumes of Air vitiated by 1 Vol.
			Vol. C.	Vol. H.					Vol. CO_2.	Vol. HO.	
	Hydrogen. . .	H	0·0	1·0	0·069	37·1	1·93	0·5	0	1	2·5
	Carbonic oxide.	C O	0·5	0·5(0)	0·967	519·2	2·43	0·5	1	0	27·5
Marsh gas series.	Methyl hydride	C_2H_4	0·5	2·0	0·553	296·9	3·91	2·0	1	2	35·0
	Ethyl-hydride .	C_4H_6	1·0	3·0	1·037	556·8	0·50	3·5	2	3	67·5
	Propyl-hydride	C_6H_8	1·5	4·0	1·520	816·2	0·00	5·0	3	4	100·0
	Butyl-hydride .	C_8H_{10}	2·0	5·0	2·004	1076·1	0·00	6·5	4	5	132·5
	Amyl-hydride .	$C_{10}H_{12}$	2·5	6·0	2·488	1336·0	0·00	8·0	5	6	165·0
Alcohol radicals .	Methyl . . .	C_2H_3	1·0	3·0	1·037	556·8	5·08	3·5	2	3	67·5
	Ethyl	C_4H_5	2·0	5·0	2·004	1076·1	2·15	6·5	4	5	130·0
	Propyl . . .	C_6H_7	3·0	7·0	2·971	1595·3	0·00	9·5	6	7	197·5
	Butyl	C_8H_9	4·0	9·0	3·939	2115·1	0·00	12·5	8	9	262·5
	Amyl	$C_{10}H_{11}$	5·0	11·0	4·906	2634·3	0·00	15·5	10	11	327·5
Olefiant gas series.	Methylene . .	C_2H_2	0·5	1·0	0·485	260·4	0·00	1·5	1	1	32·5
	Ethylene . . .	C_4H_4	1·0	2·0	0·970	520·8	16·15	3·0	2	2	65·0
	Propylene . .	C_6H_6	1·5	3·0	1·455	781·2	0·00	4·5	3	3	97·5
	Butylene . . .	C_8H_8	2·0	4·0	1·940	1041·6	0·25	6·0	4	4	130·0
	Amylene . . .	$C_{10}H_{10}$	2·5	5·0	2·425	1302·0	0·00	7·5	5	5	162·5
	Acetylene . .	C_4H_2	1·0	1·0	0·898	482·2	100·00	2·5	2	1	62·5
Benzole series. . .	Benzole . . .	$C_{12}H_9$	3·0	3·0	2·695	1471·3	0·80	7·5	6	3	187·5
	Toluole . . .	$C_{14}H_8$	3·5	4·0	3·179	1707·0	0·00	9·0	7	4	220·0
	Xylole . . .	$C_{16}H_{10}$	4·0	5·0	3·662	1996·3	0·00	10·5	8	5	252·5
	Cumole . . .	$C_{18}H_{12}$	4·5	6·0	4·146	2226·2	0·00	12·0	9	6	215·0
	Cymole . . .	$C_{20}H_{14}$	5·0	7·0	4·630	2486·1	0·00	13·5	10	7	317·5
	Naphthalin . .	$C_{20}H_8$	5·0	4·0	4·422	2374·4	0·00	12·0	10	4	311·0

3. *Impurities, or Objectionable Constituents of Coal Gas.*

These are Carbonic Acid, Oxygen, Nitrogen, Ammonia, Sulphide of Carbon, Sulpho-hydrocarbons, Sulphuretted Hydrogen, Cyanogen, and Aqueous Vapour.

(a) Carbonic Acid (CO_2).—This gas is always produced in the retorts during the early stages of the carbonization of coal; and if the coals are very wet the quantity of the gas is increased by the action of the red-hot coke on the aqueous vapour—hydrogen and carbonic acid being produced. The amount of the gas is also augmented if the exhauster draws air through the pores or fissures of clay retorts. This gas consists of carbon and oxygen in such proportions that a volume of it contains half a volume of carbon vapour and a volume of oxygen. The gas is heavier than air in the proportion of 1·5202 to 1; and it is not only incombustible, but it also checks the combustion of other gases. A taper is immediately extinguished in air containing 14 per cent. of carbonic acid; and it burns very dimly, and only for a short time, in air containing 12 per cent. of the gas. Even detonating gas (a mixture of oxygen and hydrogen in proper proportions) will not explode when it is mixed with 2·89, or a little less than three times its volume, of carbonic acid. The effect of the gas in reducing the illuminating power of coal gas is very marked. You will observe this in the experiment which I will now make. Here is the standard flame of the burning gas, and when I introduce about 3 per cent. of carbonic acid into the gas, you will notice how seriously the power of the light and the volume of the flame are diminished. My own experiments have led me to the conclusion that 1 per cent. of carbonic acid in common coal gas will diminish the light about 5 per cent.; and that 2 per cent. of it in gas will reduce the power of 14-candle gas to about 12·5. In the case of the jet, a mixture of 5 per cent. carbonic acid reduces the light to half. It is, therefore, a serious impurity, and should always be removed from gas. This is easily accomplished, for carbonic acid is soluble at common temperatures, in its own volume of water, and alkalies absorb it very freely. Caustic lime, for example, will take up nearly its own weight of the gas; and, as I have already said, the purification should always be so managed that lime is the last agent through which the gas passes on its way to the holders.

Another objectionable property of carbonic acid is its action on the animal system. In its concentrated state the gas is absolutely irrespirable, and it kills immediately by causing spasm of the glottis. Even when it is diluted with air to the extent of 1 in 10, it quickly produces insensibility, and an atmosphere containing only 4 per cent. of it is dangerous. This is the proportion found in the air expired from the lungs; and therefore I have used it in the diagram just referred to as the proportion which renders air irrespirable. As little, indeed, as 2 per cent. of the gas in air will cause distress, as headache, and great depression of the vital powers; and no doubt the discomfort which arises from the too liberal use of gas in badly-ventilated rooms is in great part due to the carbonic acid produced by the burning gas. I have found by experiment that a small gas stove in one of Phillips's baths, in my own bath-room, will charge the ai so oppressively with carbonic acid as to render it almost irrespirable. On one occasion I detected 3·5 per cent. of carbonic acid in the air of the room; and I need not say that this is a dangerous quantity. It is therefore advisable that the products of the combustion of gas, when it is burned in large quantity, should be carried out of the room; and this precaution is applicable to every illuminating agent which vitiates the atmosphere, as you will see from this diagram :—

Relative Values of Illuminating Agents,

In respect of their Heating and Vitiating Effects on the Atmosphere, when burning so as to give the Light of 12 Standard Sperm Candles.

	Pounds of Water Heated 1° Fahrenheit.	Oxygen Consumed Cubic Feet.	Carbonic Acid Produced Cubic Feet.	Air Vitiated. Cubic Feet.
Cannel gas . . .	1950	3·30	2·01	50·2
Common do. . . .	2786	5·45	3·21	80·2
Sperm oil	2335	4·75	3·33	83·3
Benzole	2326	4·46	3·54	88·5
Paraffin	3619	6·81	4·50	112·5
Camphine	3251	6·65	4·77	119·2
Sperm candles . .	3517	7·57	5·27	131·7
Wax candles . . .	3831	8·41	5·90	149·5
Stearic candles . .	3747	8·82	6·25	156·2
Tallow candles . .	5054	12·06	8·73	218·3

The mode of discovering the presence of carbonic acid in coal gas is very simple; for if the gas is passed through a little lime-water it will render it milky, or if shaken with a solution of potash the amount of absorption indicates the proportion present.

(b) OXYGEN (O).—This comes from the too active operation of the exhauster, and the drawing in of air through the retorts. The mischievous influence of this gas on the illuminating power of coal gas will be seen from this experiment, where I will pass about 6 per cent. of air into the burning gas, and you will notice how seriously the light of the flame is destroyed. It has fallen, in fact, to about half its original power. The following are the proportions of light lost by different amounts of air in gas, supposing the light to be 100: –

	Light.
2 per cent. of air in gas	90
5 " "	70
7 " "	52
10 " "	34
20 " "	12
40 " "	1
50 " "	0

The test for the presence of oxygen in coal gas is a little pyrogallic acid; and in operating you will proceed thus: First, agitate a known volume of the gas with a strong solution of potash, and observe the loss of volume—that is, due to carbonic acid; then put into the potash solution, which is still in contact with the gas, a little pyrogallic acid, and again agitate. If oxygen be present, the solution will acquire a brown colour, and the further diminution of volume is due to the absorption of oxygen. I ought to say that the gas is heavier than air in the proportion of 1 to 1·1056; and 100 volumes of water will absorb about 2·99 volumes of it at common temperatures.

(c) Nitrogen (N) is another impurity derived from the air by the action of the exhauster. The gas has no very marked influence on the luminosity of the flame, beyond this—that, in expanding under the influence of the temperature of the flame, it cools it somewhat by abstracting heat; and another objection to it is its power of forming nitric acid when it burns with the gas. There is no ready test for the discovery of this gas. It is a little lighter than air—its specific gravity being 0·9713; and it is but feebly soluble in water—100 volumes taking up about 1·48 volume of the gas.

(d) Ammonia (NH_3).—This is a product of the carbonization of the coal, and it may exist in the gas in a free state, or combined with carbonic acid. A volume of the gas consists of half a volume of nitrogen and one and a half volume of hydrogen. Its specific gravity is 0·5896, and its objectionable properties are that it attacks copper and brass fittings, and that in burning with the gas it forms nitric acid; and that it is a purveyor of naphthalin, and other heavy and fetid hydrocarbons in coal gas. The gas is readily absorbed by water; at common temperatures water will take up about 727 times its volume of the gas. It is also absorbed by dilute acids, and by many neutral salts. There is, therefore, no difficulty in removing it from gas. The test for it is moistened turmeric paper, which becomes red in less than a minute when the gas contains no more than 1 grain of ammonia in 100 cubic feet.

(e) Bisulphide of Carbon (CS_2).—This compound is almost invariably present in coal gas, and it is no doubt formed in the latter stages of the distillation when the temperature is high, and when the sulphur liberated from the pyrites comes into contact with the incandescent coke. The vapour of bisulphide of carbon is very heavy—its specific gravity being about 2·6447; and its volatility is such that it cannot be condensed from gas by cold. It is not soluble in water, but it is freely dissolved by alcohol and ether, and by the volatile and fixed oils. When the vapour of sulphide of carbon is mixed with aqueous vapour, and passed through a red-hot tube, it is decomposed, and, by a mutual interchange of elements, the sulphur is converted into sulphuretted hydrogen, and the carbon into carbonic acid. It is also decomposed when it is passed over red-hot lime, or baryta, and when it is brought into contact with the peroxides of the metals—as of iron, manganese, and tin, in an ignited state; and, lastly, I may say that it is absorbed by sulphide of ammonium, and that it is decomposed by an alcoholic or aqueous solution of the alkalies in the presence of a salt of lead. All these reactions have been made the basis of inventions for the removal of bisulphide of carbon from coal gas. Thus the solution of it in oil is the property taken advantage of it in the process of Schomberg, who proposes that the gas should be washed with oil. The decomposition of it at a red heat by steam is the recent suggestion of Mr. Lewis Thompson. The decomposition by ignited lime is the process of Mr. Bowditch; and its solution in ammoniacal liquor is the plan proposed by your president. The absorption of it by an alcoholic solution of potash or soda is the patent of Dr. Stenhouse; and the decomposition of it by passing it through a solution of oxide of lead in soda is the process of Dr. Angus Smith. And, although none of these processes have been found to be absolutely effective in practice, yet they are all more or less so; and they point to the importance of removing, as far as possible, this objectionable impurity from coal gas: for, in the act of burning, the sulphur of the bisulphide is converted into sulphurous acid, and this by further oxidation, in the presence of moisture, soon becomes sulphuric.

The tests for the discovery of this compound in coal gas are very numerous, and are founded on the reactions before mentioned. Dr. E. Herzog, for example, recommends that the gas should be passed through a strong solution of ammonia in alcohol, to which a few drops of sugar of lead have been added; and, if the bisulphide be present, it will give an orange-red precipitate. Or the gas may be passed into an alcoholic solution of potash, which freely absorbs the bisulphide, and converts it into xanthate of potash, which produces, with a solution of copper, the characteristic yellow precipitate of xanthate of copper; and, when boiled with a little sugar of lead, it produces a brown or black precipitate. Dr. Hofmann's test for bisulphide is to pass the gas through an ethereal solution of triethylphosphine, which forms with it a compound that crystallizes in the form of little prisms of a splendid red colour. But the easiest mode of discovering its presence in coal gas, and also of determining its amount, is to burn the gas at the rate of 1 foot an hour from a Leslie burner, and to carry the products of combustion, together with ammonia, into a glass cylinder, where they are condensed, and where the sulphur is afterwards found as sulphate of ammonia. The proportion of sulphur thus discoverable in coal gas ranges from about 4 grains per 100 cubic feet in the better kinds of cannel gas, to about 40 grains in the worse varieties of common London gas.

(f) SULPHO-HYDROCARBONS.—The nature of these compounds has not been determined, but there is good reason for concluding that sulphur exists in coal gas in other forms than as sulphuretted hydrogen and bisulphide of carbon. As in the last case, however, the sulphur, whatever may be its form of combination, is discoverable by the combustion process.

(g) SULPHURETTED HYDROGEN (HS) is but rarely present in coal gas, and its proportion is never large. The test which is commonly used for its detection—namely, a little sugar of lead on paper—will discover the millionth part of this impurity.

(h) CYANOGEN (C_2N).—This compound is found in but very small proportion in coal gas, although its presence is always indicated by the existence of sulphocyanogen in the water of the meters. It is a constant product of the carbonization of coals, and its proportion increases with the amount of nitrogen in the coal, and with the temperature at which they are distilled. Nearly the whole of the cyanogen is condensed in the hydraulic main, where it unites with sulphuretted hydrogen and ammonia, and forms sulphocyanide of ammonium—the compound which gives the rich blood-red colour to the persalts of iron. But a trace of the gas escapes condensation, and passes into the mains, where it forms, in like manner, the sulphocyanide. In its pure state, cyanogen is a colourless gas, with a very peculiar odour, and it is a deadly poison. It consists of a volume of nitrogen and a volume of carbon vapour condensed into one volume, and its specific gravity is 1·8006. It burns with a pale rose-coloured flame, and forms twice its own volume of carbonic acid. It is not easily absorbed by water, but it is more freely taken up by alcohol, ether, and volatile oils; and it is readily absorbed by alkalies and alkaline sulphides. It is this compound which, uniting with iron, forms Prussian blue, and so gives the blue and bluish-green colour to the spent lime (blue billy). There is no ready test for the recognition of the very small proportion of cyanogen contained in coal gas; but if a large volume of gas be passed through a tube containing flints moistened with an alkali, and the flints be acidified, they will acquire a blue colour if iron be present, in consequence of the formation of Prussian blue; or the liquid may be treated with a little sulphate of iron, and then acidified with sulphuric acid, when it will present a blue colour.

(i) The last impurity in coal gas is AQUEOUS VAPOUR (HO), the proportion of which varies with the temperature. It is rarely less than 200 grains, or about 1037 cubic inches, in 100 cubic feet of gas, and it rarely exceeds 600 grains, or 3111 cubic inches, in the 100 feet. The influence of this impurity is not very striking, although the tendency of it is to reduce the luminosity of the flame by decomposing the hydrocarbons in the burning gas.

There is one property of aqueous vapour which has not been sufficiently noticed, but which is the chief cause of the heat and discomfort so often experienced in a room where gas is largely consumed. The property which I allude to is that of absorbing the radiant heat from the burning gas, and so, by its distribution through the air, elevating the temperature of the room. When much aqueous vapour exists in the atmosphere—and, as you will see by the table already referred to, there is much of it produced by burning gas—there is not only an elevation of temperature by the absorption of the radiant heat from the gas-flame, but there is also a check to the natural evaporation from the surface of our bodies, and the perspiration collects as visible moisture. We, therefore, feel hot and uncomfortable. This is another reason why the products of the combustion of gas should be removed as speedily as possible from the room in which they are produced.

And now I have but little time left for the discussion of the second part of my subject—namely, the means to be used for the combustion of gas so as to secure the fullest amount of heat or light. I will, however, direct your attention to two or three experiments, which will illustrate the fact that the light of a flame is dependent on the number of minute solid particles within it, and on the intensity and duration of their ignition. On the one hand, if I take hydrogen gas, which contains no solid particles, and which produces no solid particles in the act of burning, it will give me a flame of no appreciable luminosity; but I can at once give light to the flame by sifting solid matter, as magnesia or lime, into it; or by dosing it with benzole, or any other volatile hydrocarbon which is rich in carbon. Again, I have here the oxyhydrogen flame; it is barely perceptible until I direct it on a piece of lime, and then the solid particles of the lime become intensely ignited, and a vivid light is the result.

On the other hand, if I destroy the solid particles of a bright flame, its luminosity disappears. Let me blow air into gas, as I can easily do with this double jet, and you will perceive how completely the light is destroyed; but the temperature of the flame is considerably increased, for I can now easily melt and burn iron with it.

The difference, therefore, which we perceive in the light evolved by different flames is entirely dependent on the different proportions of solid particles contained in them. This spirit of wine and this sulphur burn with little or no light; but this phosphorus, and this magnesium burn with a vivid light; and the results in the latter case are due to the production of solid particles (phosphoric acid and magnesia), which are intensely heated. So again, the electric light is a stream of heated particles of carbon flowing from pole to pole. I have not time to enter on the question of the relative luminosity of these several flames, but you will perceive they are all very great; and the consideration which flows from it is, that when we wish to obtain the maximum amount of light from any quality of gas, the object should be to detain the particles of carbon in an ignited state as long as possible. This can only be accomplished by a proper adaptation of the supply of air; for if the supply be too great, the particles of carbon are too quickly burnt, and if it be too little, they escape unconsumed as smoke, and the temperature of the flame is reduced. You will see, therefore, that there is no one burner which is suited for every quality of gas, unless, indeed, the supply of it to the burner is regulated. I have here a number of contrivances which have been invented for the purpose of increasing the illuminating power of a poor gas; but they are all contrivances for checking the supply of air to the flame, or for diminishing the too rapid outflow of the gas. I regret we cannot enter further upon this subject, and that I can only show you by this diagram how much the form and measurement of the burner affect the quality of the light:—

Illuminating Power of Common London Gas (13-candle), when burned from different Burners.

	Diameter of internal aperture.	Illuminating power (sperm 120).	Percentage difference.
Old brass burner, 15 holes . . .	0·70 in.	11·30	100
do. do.	0·57	12·12	108
Steatite do.	0·48	13·23	117
do. and gauze	,,	13·04	115
do. 15 holes	0·44	13·56	120
do. and gauze	,,	13·35	118
do. 15 holes	0·43	13·00	115
do. and gauze	,,	13·56	120
do. 15 holes	0·42	12·50	110
do. and gauze	,,	13·09	116
Porcelain (Bengel), 30 holes . . .	0·35	15·33	135

All the 15-hole burners had a 7-inch chimney, and the gas was burnt at the parliamentary rate of 5 cubic feet per hour; but the 30-hole burner (Bengel) had an 8-inch chimney, and the gas was burnt at the rate of a little less than 4 feet per hour, and the illuminating power was then calculated to 5 feet. It is evident, therefore, that if a fixed quantity of gas—say, 5 feet per hour—is to be passed through the burner, the burner must be selected to give the maximum amount of light, and therefore no fixed measurement of burner can be specified; but if, on the other hand, the burner is a fixed instrument, then the quantity of gas passing it in a given time must be left open, and the supply must be regulated to the best effect. This, I believe, is the proper and the fairest means of estimating the illuminating power of gas. It would then be said that with a certain specified burner—as, for example, the Bengel—a certain amount of light was given with not more than a certain quantity of gas. This is the method employed in France. In Erdmann's gas-prover, however, the condition of things is reversed, as we are here estimating the quantity of air necessary to destroy the light by burning the solid carbonaceous particles, and therefore we should experiment on the gas burning at a given rate—say, 0·84 cubic foot per hour. The instrument thus gives reliable indications of the quality of the gas, as may be seen from this diagram, which is taken from the experiments of Mr. William King, of Liverpool.

Illuminating Power of Gas when burned at a given Rate in Erdmann's Gas Prover—viz., at 0·84 *Rate Cubic Foot per Hour.*

	Description of Gas.			
	Newcastle Coal.	Equal Parts, Newcastle and Wigan.	Wigan Coal.	Boghead Coal.
Height of flame (inch) .	1·87	2·00	2·75	5·50
No. of index of prover .	4·72	23·39	32·78	61·14
Relative values of do. .	1·00	1·59	2·22	4·15
Coefficient of power . .	0·70	0·70	0·72	0·70
Illuminating power (coefficient=0·7) . . .	10·30	16·37	22·95	42·80
Do. do. by photometer .	10·30	16·35	23·58	42·96
Relative values . . .	1·00	1·58	2·29	4·17

The general laws which have been deduced from these facts are—1. That with all burners the maximum amount of light, in the case of common gas, is always secured by burning the gas at a pressure of from 0·8 to 0·12 of an inch of water at the orifices of ignition. 2. That with Argand burners of 15 holes the best size is the 0·06 of an inch for each hole, and with 30 holes the measurement should be the 0·024 of an inch; and with fish-tails or union burners, the holes should be the 0·06 of an inch, and the slit of the bat's-wing the 0·03 of an inch wide. 4. That the consumption of gas should be regulated in the Argand to a little below the top of the chimney, and in the fish-tail and bat's-wing it should not range beyond from 3½ to 4½ feet per hour. 4. As the measurement of the burner has much to do with the supply of air to the gas, the external diameter of an Argand burner with 15 holes and a 7-inch chimney should be 1·1 inch, and the internal diameter 0·44 inch; while in the 30-hole burner and 8-inch chimney (Bengel), the external diameter should be 0·89 of an inch, and internal diameter 0·35 of an inch; and the diameter of the nipple of the fish-tail or bat's-wing should range from 0·22 of an inch to 0·35.

These are the leading facts to be kept in view; and now, in conclusion, I have to say that there yet remain many important points for consideration, not only as regards the combustion of gas for economic purposes, but also as regards the chemistry of the waste products, as they are called, in the manufacture of gas; and these I hope to have an opportunity of elucidating.

Dr. Letheby was ably assisted in his lecture by Mr. Sugg, who provided all the instruments and burners used during the lecture.

Obituary.

DR. LINDLEY.

The following particulars of the life and writings of our late eminent Honorary Member is abstracted from a notice in the 'Athenæum':—

"Dr. Lindley was born at Catton, Norfolk, in 1799, and at an early age turned his attention to the study of the Vegetable Kingdom.

"Dr. Lindley's external history is briefly told. He was for many years Secretary to, not to say the life and soul of, the Horticultural Society during its palmiest days, when botanic collectors such as Douglas and Hartweg were sent out to remote parts of the world, when Knight and Sabine published the results of their investigations, and new methods of cultivation were practically and successfully demonstrated at Chiswick. To his connexion with this body of enlightened men is owing his conception of his 'Theory of Horticulture,' a work which has done more to put gardening on its proper footing than any other, and which in this country went through several editions, and has been translated into many European languages by men of real eminence. This same connexion also led him to feel acutely the want of a good weekly gardening newspaper, such as Fred. Otto had established in Berlin some years previously, and the 'Gardeners' Chronicle and Agricultural Gazette' was the result. Dr. Lindley became the editor of the paper, and held that office till the day of his death. It offered him a ready field for expressing his opinions, freely criticizing all that was unsound and shallow, and holding out that helping hand to rising talent so shamefully withheld from him on his first entry into scientific life. The 'Botanical Register' offered another opportunity of advancing his favourite science, by figuring and describing the most remarkable new plants that came to this country. Many of our garden pets, the names of which have now become household words, such as Fuchsias, Verbenas, and Calceolarias, were first made known in the pages of that periodical. Dr. Lindley's particular favourites, however, were none of the plants just mentioned, but those most singular of all vegetable forms the Orchids; and it may be said that he brought them into fashion. For many years he laboured incessantly to describe their numerous representatives, and interpret their singular structure. It took him ten years to work out 'The Genera and Species of Orchidaceous Plants,' and another ten years to complete various memoirs on these plants, which he published under the name of 'Folia Orchidacea.'

"The writings of Dr. Lindley form quite a library by themselves. There are amongst them both elementary books and works intended merely for leading men of science. His 'Fossil Flora of Great Britain' has endeared him to geologists, and his various works on gardening to horticulturists. Perhaps the most widely known of all his works is 'The Vegetable Kingdom,' which appeared in 1846, and gives a condensed account of the structure, geographical distribution and uses of plants, arranged according to the Natural system as understood by him. It was an amplification of his earlier attempts in the same direction, and has been found extremely useful. Notwithstanding that its general arrangement of the Natural Orders has never been followed by any botanist, it would be difficult to name a work which has more advanced the cause Dr. Lindley had so much at heart, than this book. When it first appeared, it was stereotyped, and the new editions are merely the old matter with some cancels and supplementary pages. 'I can do nothing more with it,' we heard him say a few years ago; 'I am getting too old to be able to sit up half of the nights as I used to do formerly; and I must leave it to younger men to finish what I have begun.' He was right; he was no longer able to sit up half the night deeply engaged in study. As it was, he had worked too hard, and overstrained his brain. His memory, which had always been most retentive, began to fail; and he suddenly found that he must give up all mental labour, at least for a time. There was a slight improvement after he had enjoyed some months of undisturbed rest, but it became soon painfully evident to all that the strength of this mental giant was broken, that Lindley had laid down his powerful pen, never to take it up again. He had to give up his connection with the Horticultural Society altogether, and resign the Professorship of Botany at University College, which he had filled for many years. He died of apoplexy on Wednesday, the 1st inst., at his residence on Acton Green, deeply regretted by a large circle of friends."

MR. JOHN EVANS.

Again has the hand of death been busy in the ranks of the aged members of the drug trade and founders of the Pharmaceutical Society, and this month we have to record another instance.

Full of years, and enjoying the respect and love of all who knew him, Mr. John Evans, the head and founder of the two eminent drug firms, Evans, Lescher, and Evans, of London, and Evans, Sons, and Co., of Liverpool; and (since the death of his contemporary and friend Thomas Herring,) we believe, the father of the drug trade, has passed from this earthly scene.

One of the founders of the Pharmaceutical Society, Mr. Evans, from his naturally retiring and unassuming character, and from his aversion to taking part in any proceedings of a public nature, refrained from personally taking a prominent part in the proceedings of the Society, yet in all that tended to its more permanent development or consolidation he most cordially sympathized, and in its varied proceedings, he exhibited a lively interest, through his partner Joseph Sidney Lescher, who for many years occupied a seat at the Council, and his sons Edward and Henry Sugden Evans, who have successively represented Liverpool on the Board for many years.

He was deeply impressed with the great advantages to be derived from the educational course of this Society, and evinced his appreciation by sending one of his sons to the laboratory and lecture course for a season, prior to his taking charge of the laboratory department of the two houses of which he was the head.

Nearly two years ago, Mr. Evans retired from the turmoil of the active business life in which he had been energetically engaged for sixty years and upwards, to his favourite watering-place, Leamington; up to this time he enjoyed most excellent health and the full exercise of all his ever-active mental and physical powers.

Mr. Evans was married thrice, has had quite a patriarchal family, and has lived to see his descendants to the third generation. He is the representative of a family long settled in Montgomeryshire, and remarkable for its longevity, the genealogy of which has been recently privately printed. He was the eldest surviving son of the late Thomas Evans, formerly of Welshpool and afterwards of Oswestry, by his wife Grace Sugden, whose earnest piety and bright example left the impress upon the characters of their children which they were calculated to produce, and to which their prosperity has to be mainly attributed. Four of them still survive, one an octogenarian, and all above the age of threescore and ten years.

The physique of the countenance of the deceased was peculiarly striking, and his presence commanding, whilst his geniality of disposition and cheerfulness and kindness of manner endeared him to every one with whom he was brought into contact.

On the 18th October, after his return from a visit to his sons in London, he was seized with his fatal illness, and expired, after much painful suffering, at his residence, Leamington, on the 17th instant, in the seventy-ninth year of his age.

"PHARAOH'S SERPENTS"—ALLEGED INFRINGEMENT OF PATENT.

VICE-CHANCELLOR'S COURTS, NOVEMBER 15.

(Before Vice-Chancellor Sir JOHN STUART.)

Barnett and Roussille v. *Leuchars*.

In this case an *ex parte* application was made on Monday last for an injunction to restrain the defendant from selling in boxes bearing the plaintiffs' labels the new fireworks called "Pharaoh's Serpent," of which the plaintiffs claimed to be the inventors, and such application was directed to stand over until to-day, in order that the defendant might be served with notice of it.

Mr. Malins (with whom was Mr. Owen), for the plaintiffs, now said that he believed the defendant wished to have the motion postponed, in order to give him time to answer the plaintiffs' evidence.

Mr. W. Morris, for the defendant, said that the defendant had a complete answer to the plaintiffs' case, and only desired time to meet their evidence.

The Vice-Chancellor accordingly directed the motion to stand over until the last day of the present term.—*Times.*

MISCELLANEA.

Accidental Poisoning by Arsenic.—On Thursday, November 9th, Mr. W. Codd, Coroner for Essex, held an inquest at Peldon, Essex, on the body of Clara Mason, niece of Mr. J. Digley, a miller in the parish. It appeared that Mr. Digley had prepared some arsenic to be boiled for destroying vermin. The arsenic had been placed in a saucepan, which the deceased, although she had seen the preparation, used for the purpose of boiling some greens. Mr. Digley, on Tuesday, was not at home to dinner, but the rest of the family (excepting a daughter) partook of the greens, and instantly showed symptoms of having been poisoned. Clara Mason, the deceased, was the most affected, and notwithstanding medical aid, she died on the following day. The rest of the family were seriously affected by the poison, but are progressing favourably. The jury returned a verdict of "Accidental Death."

Supposed Poisoning by "Locock's Pulmonic Wafers."—An inquest was held before Dr. Birt Davis, at Birmingham, November 3rd, when evidence was given to the effect that Alfred Ernest Pumphrey, a child of a year and ten months old, was put to bed mid-day in perfect health, when taken up at two o'clock, he was found to be unable to stand, his eyes were heavy, and turned upwards, but no contraction of the pupils was noticeable. It was concluded that the child had had a fit of some kind during his sleep, he was put into a warm bath, and castor oil was given. The medical man saw the child at five o'clock, and left considering that he was suffering from the effects of a convulsive fit. The child died about six o'clock. An examination was made, and there was no evidence of disease in the heart, lungs, or digestive organs, but there was congestion of the brain, with a little effusion of blood. The second day after death the real cause was discovered: a box was found empty under the child's crib that had contained Locock's Pulmonic Wafers. The servant had placed the box of wafers with some other things behind the looking-glass, but within reach of the child from his crib. There was no blame attached to the servant, and the wafers, it was stated, contained morphia. The jury returned a verdict of "Accidental Death."

Accidental Poisoning by Oil of Vitriol.—A distressing case of accidental poisoning occurred in Galashiels. An infant of Mr. Hugh Roberts, manufacturer, having shown some symptoms of croup, its mother administered a dose of what she supposed to be pectoral syrup; but from the effect which the medicine took upon the child, it was at once seen that a fatal mistake had been made, and, on examining the bottle, it was found to contain vitriol, which had been put into it some time previously. The label of the original contents of the bottle having been left adhering to it led to the mistake. Medical aid was immediately called, and everything was done that skill could suggest, but the little sufferer died within a few hours after the administration of the poison.

Poisoning by Veratria.—The inquiry respecting this case, the particulars of which appeared in our number for October, page 244, was resumed, for the seventh time, on Thursday, October 19th, when the following verdict was returned:—"That the deceased, Elizabeth Reeve, came by her death, on the 15th of August, 1865, from the effects of a deadly poison known as veratria, or hellebore; but how, when, or by whom such poison was administered there is not sufficient evidence before them to show. The jury, however, wish to add that in their opinion the taking of such poison was not the act or deed of the deceased herself."

Poisoning by Strychnine.—Dr. Wilson relates a remarkable case of this kind in which a young man took, it was supposed, four grains of strychnine, though it is not stated how the quantity was ascertained, and yet recovered so as to be able, fifteen hours after swallowing the poison, to leave the hotel by an omnibus for the railway. It is conjectured that some coffee which he took after the poison, and the fact of his having taken the latter in bread, which was soon vomited up, had much to do with his recovery. The convulsions were of a very terrific character, with very short remissions. The remedies employed were tannin and opium.—*American Journal of Med. Science* and *Medical Gazette.*

Wholesale Poisoning.—A remarkable case of wholesale poisoning, by mistake, recently occurred in the town of Shiloh, Randolph County, Illinois. Two physicians, Drs. Campbell and Minner, residing in the town, sent to a drug store in the neighbouring village of Chester for a quantity of calomel. In the course of one day this calomel was administered to some forty persons. All of these persons were taken violently ill, and on examination it was found that large quantities of corrosive sublimate had been mixed with the calomel. Further inquiry showed that the drug thus adulterated had not been tampered with by the apothecary in Chester, for calomel mixed with corrosive sublimate was found in the warehouse of the wholesale dealer in St. Louis, from whom the retailer had purchased it; and on following up the investigation it became evident that the presence of the poison was due to the carelessness of the British manufacturer of the calomel. Seven of the victims of this dreadful mistake have already died in the town of Shiloh alone. How much further the results of the blunder have extended or will extend it is now impossible to say. The St. Louis dealer had sent the adulterated calomel all over the south-west, as well as to many sections in the west, and while the authorities are doing their best to obtain possession of the "doctored" stuff, it is not impossible that the fatal results of its use have not yet ended.—*American Corr. of Standard.*

Suicide by Emerald Green.—On Wednesday, October 18th, an inquest was held in Lever Street, St. Luke's, respecting the suicide of Mrs. Jane Secknall, aged fifty-one years. The deceased, the widow of a sergeant of the Metropolitan Police, admitted to a medical man having taken about a teacupful of emerald green, in consequence of having a row with a relative. Emetics were administered, but she expired in twelve hours after taking the emerald green. The *post-mortem* examination showed that there was a large quantity of arsenic in the stomach of deceased. The jury returned a verdict of suicide while of unsound mind.

Suicide by Strychnine.—Mr. C. J. Carttar, coroner for West Kent, held an inquest on the body of Frances Symonds, aged sixty-eight, a married woman, who committed suicide by swallowing a quantity of prepared powder usually sold for killing rats, and known as "Battle's Vermin-killing Powder," the ingredients of which contain a large portion of strychnine. The evidence showed that the deceased, who was addicted to habits of intemperance, left home on Sunday morning last and purchased a threepenny packet of the above powder at a neighbouring chemist's, and on returning home mixed it in some liquid and drank it. The chemist at whose shop the poison was supposed to have been purchased said it was generally sold to persons who asked for it without any questions being put, and Dr. Cogan, who had been called to the deceased, said that a threepenny packet of the poison would contain a grain and a half of strychnine, and that the deceased must have suffered excruciating agony. The Coroner said it could never have been the intention of the Legislature that such a compound should not come within the "Sale of Poisons Act."* Verdict, "That the deceased committed suicide while labouring under temporary derangement."—*Times*, Sept. 7.

Suicide by Oil of Vitriol.—On Thursday, July 27th, Dr. Lankester held an inquest at the Silver Cup, Cromer Street, on Fanny Kemble, aged twenty-seven, who had committed suicide. Henry Kemble, 3, Brighton Street, King's Cross, said, that deceased was his daughter. She worked as a dressmaker. On Sunday last she came to see witness, and she said to him, "Father, I am miserable." Wherever I go to lodge, the people keep annoying me. They will have my life. I have asked the police to protect me, and they say that they will." Witness now was of opinion that she was, when she said this, out of her mind. He replied to her at the time, "I will see what I can do," and he went out. When he came back he found that she had poisoned herself. She used to speak constantly about a sweetheart, but witness paid no attention to the matter. Evidence was given, that after the father of the deceased left the house the deceased went out with a teacup to a chemist's, and returned with some oil of vitriol. She then locked herself in her room, and about an hour afterwards her brother, hearing of what had taken place, burst open the door, when she was found lying dead on the floor, with the cup by her side. The coroner having summed up, the jury returned a verdict of "Suicide while of unsound mind." Dr. Lankester said that death by oil of vitriol was so excessively painful that chemists were thrown off their guard when asked for that poison, as but few persons could possibly drink it.

The Atlantic Ooze.—When the substance called ooze came up on the grapnel line of the "Great Eastern," from a depth of nearly two miles, it was simply a light-coloured mud, like that which a heavy shower makes in the streets of London. Mr. Ward, surgeon of the vessel, got a very small shellfish, just visible to the naked eye, from the grapnel line, which, on examination under a feeble microscope, looked like a young barnacle, and gave signs of life, but we had no *savants* among us. Whether he came up direct *de profundis,* or was a young truant wandering from his numerous family on the ship's bottom, is questionable, but the weight of opinion was in favour of the latter supposition. The ooze, as it is called, under the same scrutiny, presented none of the shells of which microscopists say it is altogether composed. Nay, they pretend to have found the fish in them still preserved by the natural pickle of the sea, which has made an in-

* There is no such Act in force, and if the "Sale of Arsenic Act" is alluded to, that of course would not apply.

genious gentleman advance the horrible theory that all the dead men who have been thrown overboard in their shotted hammocks are standing bolt upright and perfectly fresh at the bottom of the sea, like an army waiting for the order to march. What seemed to us all sand and gravel was to Ehrenberg and other microscopists *Foraminiferæ* and *Diatomaceæ*—shells of exquisite fineness, showing conclusively by their perfection of outline that no currents or agitation of water exist in the place whence they come. But it is further contended that these creatures, when alive, could not have inhabited these depths because the pressure would have been too great, and then one is launched on a sea of conjecture to decide how they were ever brought there, and how they floated in myriads of millions—which no words or formulæ can express—on the surface waters, and sank down to form slabs of organic remains of impenetrable depth and unknown extent beneath. Not a trace of any mineral substance can be found, it is averred, in these illimitable submarine prairies. The cable may then rest undisturbed here if these be all there is to fear, for there is no current and no teredo to warp its course and eat through the hempen covering of the wire, which suffers much in other seas. But as a mite would in all probability never have been seen but for the invention of cheese, so it may be that there is some undeveloped creation waiting *perdu* for the first piece of gutta-percha which comes down to arouse his faculty and fulfil his function of life—a gutta-percha boring and eating teredo, who has been waiting for his meal since the beginning of the world. As to sharks, the ônly remark that one can make is, that no instance has yet occurred of a cable being injured by a fish of any kind. Porpoises, grampuses, black fish, and whales fly from it, so that the cable under water is much better off than the wire on land in India and other places, where the monkeys are persuaded the poles and lines are erected for their special benefit, and elephants use the fences as scratching-posts.—*Fortnightly Review.*

Relief in Cancer.—It is stated that Dr. Brandini, of Florence, has discovered a real alleviation for the torments caused by this malady. In his account of his discovery, he says that one of his patients, aged seventy-one, at the hospital of Santa Maria della Scala, being afflicted with cancer on the tongue, in the midst of his torments asked for a lemon, the juice of which almost immediately diminished the pain. The patient, on finding this, asked for another on the following day, and it gave him still greater relief than before. This led Dr. Brandini to try citric acid itself, in a crystallized state. A gargle was composed of 4 grains of the acid in 350 grains of common water, and it entirely carried off the pain; on its reappearing, the same remedy was repeated with the same success. In the course of a month this treatment not only delivered the patient from all suffering, but even reduced the swelling of the tongue very considerably. Dr. Brandini had also tried the same remedy in other cases with similar results.

Aventurine.—M. Pelouze, the eminent Paris chemist, has recently made a communication to the French Academy, in which he discloses his method of making *aventurine*. The secret of the composition of this substance has long been in the hands of Neapolitan jewellers. They derived it from a Venetian workman, who is stated to have hit on the materials accidentally, whence its name, *aventura*. M. Pelouze's *aventurine* consists of 80 parts of oxide of iron, 40 parts of protoxide of copper, and 300 parts of powdered glass, submitted to a high temperature for twelve hours and then allowed to cool gradually. A better quality of *aventurine*, and far superior to that originally made in Venice, may be prepared by mixing 40 parts of bicarbonate of potash, 50 of carbonate of lime, 100 carbonate of soda, and 150 of sand.—*Athenæum.*

Results of the Explosion of Nitro-glycerine.—The new blasting-material is a light-yellow oily fluid—a compound of glycerine and nitric acid, its chemical formula being $C_6H_5O_3(NO_5)_3$, which gives 18 parts of oxygen; and Mr. Nobel claims that as by combustion the carbon takes 12 atoms of oxygen, and the hydrogen 5, its complete combustion leaves a surplus of O_1 only. He states, moreover, that each 100 parts of exploded blasting-oil leaves a residue of carbonic acid, 58; water, 20; oxygen, $3\frac{1}{2}$; and nitrogen, $18\frac{1}{2} = 100$; and that as the specific weight of the oil is 1·6, one volume produces nearly 1300 volumes of gas,—that is to say, steam, 554; carbonic acid, 469; oxygen, 39; and nitrogen, $236 = 1298$ volumes. Weight for weight, the blasting-oil bears very favourable comparison with gunpowder, which is calculated to produce ordinarily about 250 volumes of cold gas only; the nitro-glycerine would, consequently, appear to be, other things being equal, about five times as effective as gunpowder. But Mr. Nobel goes further than this, for he remarks that it is difficult to determine the degree of heat produced by an exploding substance, and that, according to theory, the blasting-oil, on account of its complete combustion, ought to develope a more intense heat than gunpowder, and this appears to be borne out by experiment; whence he assumes that the heat developed by the explosion of nitro-glycerine is twice that generated by gunpowder, and from this calculates that nitro-glycerine, compared with gunpowder, possesses about 13 times its power, when volumes are considered, and 8 times its power for equal weight; and that owing to its rapidity of explosion its advantages are still greater.—*Chemical News.*

Sulphate of Zinc in Burns and Scalds.—Dr. F. L. Keyes, of Jerseyville, Canada West, in a communication to the 'Philadelphia Medical Reporter,' recommends the use of a solution of sulphate of zinc (about three grains to the ounce) as an application for burns or scalds. Pieces of soft cotton on lint are dipped in the solution, and applied to the parts. When the dressing becomes partially dry, it should be again moistened with the solution without being removed. Dr. Keyes states that there is but one exception to its use,—burns by gunpowder, when a portion of the unburnt powder is deposited in the skin, proportionably to the imperfection of the combustion. In such a case the wash would be inadmissible, as it would act as a solvent of the granules and cause irritation. In these cases he prefers the carbonate of lead in the form of a paint.

REVIEWS.

Manual of Materia Medica and Therapeutics. Being an Abridgment of the late Dr. Pereira's Elements of Materia Medica, arranged in conformity with the British Pharmacopœia, and adapted to the use of Medical Practitioners, Chemists and Druggists, Medical and Pharmaceutical Students, etc. By Frederick John Farre, M.D. Cantab., F.L.S., etc., assisted by Robert Bentley, M.R.C.S., F.L.S., etc., and Robert Warington, F.R.S., F.C.S., etc. London: Longmans, Green, and Co. 1865.

We have much satisfaction in announcing the appearance of this long looked-for book, which will supply a want that has been much felt and frequently expressed. Of all the works on Materia Medica, that of Dr. Pereira has acquired the highest and most widely-extended reputation, for the comprehensiveness of its design and the copiousness and general accuracy of its details, affording evidence of much laborious research and the possession by the author of a thorough practical acquaintance with every department of the subjects treated of. But the fulness and comprehensiveness of Dr. Pereira's work, which have added so greatly to its value as a work of reference and for the use of advanced students, have placed it beyond the reach of a large number of those who are engaged in the study and practice of the departments of medicine involving an acquaintance with Materia Medica. This class of readers will find in the volume produced by Dr. Farre and his able coadjutors a well-digested abridgement of that great work, containing what is really essential for their use. Although an abridgement, it must not, however, be considered that the 'Manual of Materia Medica and Therapeutics' is a mere brief digest of the matter. If produced with less modest pretensions as an original work, it would have been classed among the most extensive and copious of its kind. Being printed in double columns, with no unnecessary loss of space, there is a great amount of matter condensed into its pages, and the matter is remarkably well arranged for facilitating occasional reference as well as systematic study.

The object and scope of the editor will be best appreciated by the following extract from the preface:—"The great work on Materia Medica, which I have undertaken to reduce to a more convenient size and to adapt for more general use, is a mine of wealth which probably few readers have yet exhausted. The incessant labours of its late author, the extent to which he pushed his inquiries, and the pains which he took to verify all the information which he collected, give to his work a peculiar value and authority. Its copiousness, however, had become embarrassing; not, indeed, to those who desired to study the subject in the comprehensive spirit of the author, but to the majority of medical practitioners, pharmaceutical chemists, and medical and pharmaceutical students, who, having only a limited portion of time at their disposal, were obliged to be content with such an amount of information as they could reasonably hope to acquire, and such as would most assist them in their daily occupations. Bearing this in mind, I have reduced the large work to about one-third of its size, without, I trust, diminishing—may I venture to hope with some increase of—its general utility. This, however, could not be done without strictly adhering to the following rules:—

"1. To omit all remedial agents, except those which the author termed pharmacological, such as mental, physical but imponderable, and hygienic remedies, or, to be more specific, the influence of the mind, of light, heat, electricity, food, exercise, climate, etc.

"2. To omit all pharmacological remedies which are not officinal, or contained in the British Pharmacopœia.

"3. To omit all classification of medicines, except the two classifications which the author himself adopted: one founded on the chemical classification of the inorganic bodies, and on the botanical and zoological classifications of the plants and animals which yield the organic bodies; the other founded on their physiological effects. These rules could not be carried out without excluding much valuable matter; but it appeared to me the wisest course to act like a judicious horticulturist, who, in reducing a tree to the necessary limits, removes the too luxuriant branches, rather than prune too closely those which bear the most valuable fruit. I have also somewhat abridged the botanical and zoological characters, and even in many cases the descriptions of the drugs themselves, important as the latter are, in order to avoid all unnecessary repetition. In doing this, I have sometimes made the author's descriptions appear more scanty and incomplete than he left them. My reason, however, is easily explained. The British Pharmacopœia contains, in addition to the names and definition of articles of the Materia Medica, short descriptive characters and tests. These are frequently original, but have frequently also been taken from standard works on Materia Medica, and from none more largely than from the author's. When his remarks have thus been made to contribute to form the '*officinal character*,' they have not been repeated in the subsequent '*description*.' In selecting the most important parts of the work, I have experienced another difficulty. There are some opinions expressed—for example, on the subject of bleeding—which will hardly find acceptance at the present time, and which the author, if living, would probably himself have modified. But the present opinions and practice are still recent, and may in their turn yield to further experience. I have therefore avoided, as far as I could, interfering with the opinions expressed by the author, while I have not hesitated to alter whatever was decidedly erroneous. On the other hand, although my chief object has been to prepare a smaller work, by excluding the least important parts of the 'Elements,' much new matter has, at the same time, been introduced into the abridgment, in order that it may represent more correctly the present state of our knowledge. The new matter is occasionally indicated by (Ed.), but far more frequently it is introduced without notice. The *Physiological Classification of Medicines* I have removed from the situation where the author placed it to the end of the work, conceiving that it would be better understood after some knowledge had been acquired of the individual medicines."

The editor was assisted in his labours by Professor Bentley and Mr. Warington, who are referred to in the Preface, as follows:—

"It remains for me to acknowledge the valuable assistance I have received from Professor Bentley and Mr. Warington. The former has assisted me chiefly in the description of the organic bodies, and of the plants and animals which produce them; the latter chiefly in the inorganic bodies. The extensive knowledge of these gentlemen in their respective departments has greatly contributed to the accuracy of the work."

As illustrations of the extent of abridgment which has taken place we refer to the articles on Mercury, Cinchona, and Opium: the former in Pereira's 'Elements,' extended over seventy-five pages, in the present Manual it occupies about sixteen pages; Cinchona is reduced from eighty-two pages to twenty-one pages; and Opium from seventy-three pages to twenty-two pages. It should be mentioned, however, that the pages in the present edition contain somewhat more matter than in the former work.

Speaking of the adulteration of scammony, the Editor makes the following observations:—

"In short, scammony used to be adulterated to the extent of 30, 50, and even 75 per cent., to enable it to be sold in the market at a corresponding price. But the efforts and example of the leading Pharmaceutical Chemists, and the liberal and enlightened feeling that has been fostered by the institution and publications of the *Pharmaceutical Society*, have led Pharmaceutists generally, in this and other cases, to prefer pure to adulterated drugs; and for several years those who were willing to pay the price of pure scammony have had little difficulty in obtaining it."

We subjoin two illustrations:—

"IPECACUANHA,

Ipecacuan.

"The root dried; imported from Brazil.

"*Collection.*—The roots are gathered at all seasons of the year, though more frequently from January to March inclusive; and as no care is taken in the cultivation of the plant, it has become scarce around the principal towns. According to Weddell, it was principally collected, in the year 1851, in the interior province of Matto Grasso, in Brazil. The roots are cut from the stems by the Indians, who are the chief collectors, cleaned and hung up in the sun to dry.

"*Commerce.*—Ipecacuan is principally imported into this country in bales or serons, from Rio Janeiro; but also from Bahia, Pernambuco, and rarely from Carthagena.

"*Officinal Characters.*—In pieces three or four inches long, about the size of a small quill, contorted, and irregularly annulated. Colour brown of various shades. It consists of two parts, the cortical or active portion, which is brittle, and a slender tough white woody centre. Powder, pale brown, with a faint nauseous odour, and a somewhat acrid and bitter taste.

"*Description.*—Ipecacuan has a knotty appearance, in consequence of a number of deep circular fissures about a line in depth, and which extend inwardly to a central ligneous cord (meditullium), so as to produce the appearance of a number of rings strung upon a thread (hence the name, *annulated*, which is applied to it by Continental writers). These rings are unequal in size, both with respect to each other and to different parts of the same ring. It has a resinous fracture. In 100 parts of good ipecacuan, there are about 80 of cortical portion, and 20 of meditullium. Ipecacuan has an acrid, feebly aromatic, somewhat bitter nauseous taste, and a slightly nauseous but peculiar odour. The colour of the root varies, being brownish, reddish-brown, greyish-brown, or grey. The powder is of a pale brown or grey colour.

"Three varieties of ipecacuan are found in commerce, whose principal distinction is the colour of the epidermis. The age of the root, the nature of the soil, and the mode of drying, are among the different circumstances producing these varieties. Sometimes they are met with in the same package. *Brown Ipecacuan.*—This is the best kind. The greater part of the ipecacuan of commerce consists of this variety. Its epidermis is more or less deeply brown, sometimes even blackish; its fracture is grey or brownish, its powder is grey. The cortical portion has a horny appearance. *Red Ipecacuan.*—This differs from the preceding by the lighter and reddish colour of its epidermis, by its less powerful odour, and by its want of aromatic taste. Sometimes it has, when broken, the same horny and semitransparent quality as the brown ipecacuan, but more frequently it is opaque, dull, and farinaceous; in which case it is generally less active. *Grey Ipecacuan.*—The colour of this variety is greyish-white. Grey ipecacuan occurs in pieces of larger diameter than either of the foregoing kinds, with fewer, more irregular, and less prominent rings."

"SENNA ALEXANDRINA,

Alexandrian Senna.

"The leaves of Cassia lanceolata, and Cassia obovata, imported from Alexandria; carefully freed from the flowers, pods, and leafstalks of the same, and from the leaves, flowers, and fruit of Solenostemma Arghel, *Hayne.*

"*Collection, and Commerce.*—Alexandrian senna is collected in Nubia and Upper Egypt, and is conveyed down the Nile to the great depôt at Boulak. The Arabs make two crops annually; the most productive one is that after the rain in August and September, the second takes place about the middle of March. When cut, the plants are spread out on the rocks, and dried in the sun. Assouan is the first entrepôt for senna. It receives all that is gathered in the neighbourhood. Esneh is another entrepôt. It receives the lanceolate-leaved senna from Abyssinia, Nubia, and Sennaar, from whence it arrives by the caravans which convey negroes to Egypt, and the obovate-leaved senna, gathered in Upper Egypt. Daraou, between Assouan and Esneh, is also an entrepôt; but the great depôt is at Boulak, the port of Cairo. The senna arrives at Boulak from Assouan, not only by the Nile, but also sometimes by the way of Cosseir, the Red Sea, and Suez. Lastly, some senna is carried to Boulak by the caravans from Mount Sinai. The mixture of the different leaves takes place at the entrepôts. Rouillure says that at Boulak, 500 parts of acute (lanceolate) leaves are mixed with 300 of obtuse (obovate) leaves and 200 of Arghel leaves. From Boulak the senna is sent to Alexandria, and from thence is shipped to Europe.

("To this account of the author taken from Delile, Burckhardt, and others, may be added the more recent statement of Ignatius Pallme, who travelled in the interior of Africa. He says, 'Senna is found in abundance in many parts of Kordofan, but the leaves are not collected on account of the existing monopoly. The government draws its entire supply from Dongola in Nubia, which is the true native country of senna, and sells them under the denomination of Alexandrian or Egyptian senna, though not one-fiftieth of the leaves are collected in Egypt, as they are first met with at Assouan in Nubia.—Ed.)

"We also frequently find in Alexandrian senna, *as imported*, mixed with the leaflets of the two species of Cassia, a variable proportion of the leaf-stalks, flowers, and legumes of the same plants, and also of the leaves, flowers, and fruits of *Solenostemma* (*Cynanchum*) *Arghel*, and rarely, of the leaflets and legumes of *Tephrosia Apollinea*, beside other extraneous matters, as date-stones, rabbit-dung, etc. All these are directed in the Pharmacopœia to be carefully removed before the senna is fit for use; it then constitutes what is properly termed *picked Alexandrian senna*, to which the officinal characters apply.

"*Officinal Characters.*—Lanceolate or obovate leaflets, about an inch long, unequally oblique at the base, brittle, greyish-green, of a faint peculiar odour, and mucilaginous sweetish taste.

"*Description.*—The leaflets of Alexandrian senna present a more or less broken appearance. Alexandrian senna varies much in its constitution. When picked according to the directions of the British Pharmacopœia, it is generally composed chiefly of the lanceolate leaflets, mixed with a few obovate leaflets; but recently large importations of this kind of senna have taken place, composed almost entirely of obovate leaflets. It has a nauseous, mucilaginous taste, and a peculiar odour, somewhat resembling that of tea.

"The senna *leaflets* are readily distinguished by being unequal-sided at the base, and by the veins or nerves of their under surface being very conspicuous. The lanceolate leaflets are very readily distinguished from those of the obovate species, by their shape. The dried *flowers* of Cassia may be easily detected: they are dull yellow. The *legumes* of the lanceolate and obovate Cassia are also found; they are distinguished by the botanical characters before described.

"*Adulterations.*—Alexandrian senna, as imported, always contains, as noticed above, a variable proportion of extraneous matters, which are directed to be removed. The more serious admixture is that of the Arghel leaves, flowers, and fruits (*Solenostemma Arghel*), and of the leaflets and legumes of *Tephrosia Apollinea*. *Arghel leaves, flowers, and fruit.*—The Arghel plants are collected by the Arabs, in the valleys of the desert to the east and south of Assouan. The *leaves* found in the Alexandrian senna are distinguished from the senna leaflets by their being equal-sided, by the absence or imperfect development of their lateral nerves, by their paler colour, thicker and more coriaceous texture, by a yellowish exudation frequently found on them, and generally, though not invariably, by their greater length. By careful picking the *flowers* may be detected; they are white, and in small corymbs. The *fruit*, as found in Alexandrian senna, a little exceeds in size a large orange-pip. It is ovate-shaped, tapering superiorly, brown, shrivelled, and contains several seeds. *Tephrosia leaflets and legumes.*—The *Tephrosia Apollinea* grows in cultivated fields near the Nile, at Hermonthis, at Edfou, and in the Elephantine Islands, opposite Assouan. The *leaflets* have a silky or silvery aspect; they are obovate-oblong, somewhat cuneiform, emarginate, equal-sided, tapering towards the base, lateral veins parallel, regular, and oblique to the midrib. These leaflets are usually folded longitudinally, and are very apt to be overlooked. The *legume* is from an inch to an inch and a half long, not exceeding two lines broad, linear, slightly ensiform, and contains six or seven brownish seeds.

"*Test.*—The unequally oblique base, and freedom from bitterness, distinguish the senna from the Arghel leaves, which are also thicker, stiffer, greyer, and more wrinkled."

A Dictionary of Practical Medicine. Comprising Special Pathology, the Principles of Therapeutics, the Nature and Treatment of Diseases, Morbid Structures, and the Disorders especially incidental to Climates, to Races, to Sex, and to the Epochs of Life: and with an Appendix of Approved Formulæ. The whole forming a Digest of Pathology and Therapeutics. By James Copland, M.D., F.R.S., etc. etc. Abridged by the Author, assisted by James C. Copland, M.R.C.S. and M.S.A., and throughout brought down to the Present state of Medical Science. London: Longmans, Green, and Co. 1866. Pp. 1537.

The original work, of which the present is an abstract, was published in 1858, in four large and thick volumes, and when we consider the enormous amount of labour which such a treatise necessarily involved, we cannot but regard it as one of the most wonderful works ever accomplished by an unassisted author in this country or elsewhere. This original 'Dictionary of Practical Medicine,' by Dr. Copland, is known and appreciated wherever the English language is spoken, but its great size and price prevented numerous practitioners from adding it to their libraries. Hence, to reach this class, and also to bring down the subjects treated of in the former work to the present state of medical science, this abridged edition has been issued. It is scarcely within our province to examine very critically such a work, but after carefully reading several of the articles we can testify to its general accuracy, and to its being on the whole a very accurate digest of the present state of medical science. Amidst so much that is good, we scarcely like to allude to the very brief and necessarily imperfect notice which is given of the laryngoscope and its value in the diagnosis and pathology of laryngeal disease. Surely, a subject of such importance as laryngoscopy, which had already given rise to several treatises, deserved more than the few lines the author has devoted to it.

At the end of the volume we have a very complete Appendix of Formulæ, which the pharmaceutist may frequently refer to with great advantage.

The Surgeon's Vade Mecum: a Manual of Modern Surgery. By Robert Druitt. Ninth Edition, much improved, and illustrated by Three Hundred and Sixty highly-finished Wood Engravings. London: Henry Renshaw, 356, Strand; John Churchill and Sons, New Burlington Street. 1865.

A volume, the first edition of which was published more than a quarter of a century since, and has now reached its ninth edition, is substantial evidence in itself of its popularity, and the best criterion of its merits. From a careful perusal we are enabled to say that this edition has been much improved, and is a faithful representation of the present advanced state of Surgery. A work like this, which is at once concise, clearly written, and up to the state of our knowledge of surgical science and art at the period of its publication, cannot but prove a great boon to general practitioners and others, whose time is too much occupied with professional labours to allow of their studying larger and special treatises. We know also from personal experience, having used it as a text-book nearly twenty years since, that it is admirably suited to students attending lectures, or who are preparing for their examinations. Our province is, however, more especially with pharmaceutists, and to them we especially recommend the perusal of the Appendix of Formulæ at the end of the volume. This has evidently been compiled with great care and discretion, and contains accurate transcripts of the original formulæ of many eminent physicians and surgeons, as Abernethy, Sir B. Brodie, Sir A. Cooper, Dover, Good, Moses Griffith, Marshall Hall, Heberden, Hooper, Hope, Jephson, Locock, Plummer, Prout, Scudamore, etc. etc. Most of these famous medicines are now in common use and not a few of them have been adopted, with certain alterations, in our Pharmacopœias.

In an interesting chapter in the body of the volume, "On the Means of Producing Insensibility to Pain," we are pleased to find that notice is taken of the trial of the inhalation of the fumes of chloric ether, as an anæsthetic, by Mr. Jacob Bell, before the value of chloroform for such a purpose had been established by Dr. Simpson.

Des Odeurs, des Parfums, et des Cosmétiques; Histoire Naturelle, Composition Chimique, Préparation, Recettes, Industrie, Effets Physiologiques et Hygiène des Poudres, Vinaigres, Dentifrices, Pommades, Fards, Savons, Eaux Aromatiques, Essences, Infusions, Teintures, Alcoolats, Sachets, etc. Par S. Piesse, Chimiste Parfumeur à Londres. Édition Française, publiée avec le consentement et le concours de l'auteur, par O. Reveil, Professeur Agrégé a l'École de Pharmacie et à la Faculté de Médecine. Paris: J. B. Baillière et Fils. 1865.

About three years since, when reviewing in this Journal the third edition of 'The Art of Perfumery, and the Means of Obtaining the Odours of Plants,' by Septimus Piesse, we recommended the volume as the best practical treatise on perfumery to be found in the English language. The favourable opinion then expressed by us has been proved to have been deserved, for the work has not only gone through several editions in this country, but has been reprinted in America, and translated into German and French. The French translation, which is the subject of our present notice, appears to have been prepared with much care, and is enriched by the addition of new matter by the author and translator, and especially by the introduction, by M. O. Reveil, of an interesting chapter, entitled "Hygiène des Parfums et des Cosmétiques," which will well repay perusal. We regret to state that Dr. Reveil has died since the appearance of his translation.

Transactions of the Odontological Society of Great Britain. Vol. IV. 1863-64-65. London: Published by the Society. 1865.

This volume bears ample testimony to the success which has attended the Scientific Meetings of the Odontological Society. Many of the papers are of great value in a practical point of view; and others are of a high scientific character. The volume is beautifully illustrated, and well printed.

BOOKS RECEIVED.

Clinical Memoranda. By William Hinds, M.D. and Professor of Botany, Queen's College, Birmingham. No. 1. On Pericarditis and Pericardial Murmurs. Birmingham: Arthur B. Matthews, 1865.

On Epidemic Cholera and Diarrhœa; their Prevention and Treatment by Sulphur. By John Grove, M.D., M.R.C.S.L. Third Edition. London: Robert Hardwicke, 197, Piccadilly. 1865.

Manual of Materia Medica and Therapeutics: being an Abridgment of the late Dr. Pereira's 'Elements of Materia Medica.' Arranged in conformity with the British Pharmacopœia, and adapted to the use of Medical Practitioners, Chemists and Druggists, Medical and Pharmaceutical Students, etc. By Frederick John Farre, M.D., etc., assisted by Robert Bentley, M.R.C.S., F.L.S., etc., and by Robert Warington, F.R.S., F.C.S., etc. London: Longmans, Green, and Co. 8vo. Pp. 614.

On the Means Employed for Correcting the Inverted Image on the Retina of the Eye. By Joseph Swan. London: Bradbury, Evans, and Co., Bouverie Street. 1865.

A Dictionary of Practical Medicine: comprising Special Pathology, the Principles of Therapeutics, the Nature and Treatment of Diseases, Morbid Structures, and the Disorders especially incidental to Climates, to Races, to Sex, and to the Epochs of Life; and with an Appendix of approved Formulæ. The whole forming a Digest of Pathology and Therapeutics. By James Copland, M.D., F.R.S., etc. etc. Abridged by the Author, assisted by James C. Copland, M.R.C.S., etc., and throughout brought down to the present state of medical science. London: Longmans, Green, and Co. Pp. 1537. 1866.

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 of 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.

Y. Z. (Maidstone), and other Correspondents.—Pereira's 'Manual of Materia Medica and Therapeutics,' by Farre, Bentley, and Warington, may now be obtained through any bookseller.

One who purposes joining the Society.—Bentley's 'Manual of Botany,' and Pereira's 'Manual of Materia Medica,' by Farre, Bentley, and Warington.

An Intending Student (Brighton).—Fownes's 'Manual of Chemistry,' Bentley's 'Manual of Botany,' and Pereira's 'Manual of Materia Medica,' by Farre, Bentley, and Warington.

J. S. (Hull).—"Pharaoh's Serpents" are subject to a provisional patent for six months, date September 7, 1865. It will be seen from another part of this Journal that an action has been commenced for alleged infringement of the patent.

J. S. (Driffield) wishes for a formula for *Syrupus Ferri et Calc. Hypophosph.*

Pharmaceuticus Juvenis (Bury St. Edmunds).—(1) See a paper, by Mr. Reynolds, on the subject, vol. v. (2nd series) p. 260. (2) By the minute division of the oil which is thus diffused through the water. (3) *Tonquin Beans* are the seeds of *Dipterix odorata.*

M. P. S. (Notts.).—The mushrooms should be sprinkled with salt and allowed to remain two or three days before squeezing out the juice. When this part of the process is observed the ketchup keeps well, if boiled sufficiently.

T. W.—(1) We are unable to give the information required; the Colonies probably would afford the best opportunity. (2) The abridged edition of the work would answer the purpose.

C. D. A. (London).—*Compound Syrup of Phosphates*, vol. xviii. p. 579.

J. R. C. (Warrington).—Vol. xviii. p. 579.

An Apprentice (Spalding).—Yes: apply, by letter, to the Secretary, 17, Bloomsbury Square, who will forward the particulars required.

"*Trosch*" (Barton).—It is uncertain; probably the beginning of the year.

J. B. (Leeds).—The label renders the article liable to stamp duty.

Mr. Redford (Liverpool) and *Mr. Sharples* (Preston) are thanked for their communications.

W. H. T. will find the subject fully explained in the leader this month.

Messrs. T. and H. Smith wish us to state that they will supply (gratis) to any druggist applying for them, labels to be attached to the shop bottle containing *Liq. Ferri Perchloridi B. P.*, containing full directions for its use as an antidote for Prussic Acid, Cyanide of Potassium, Antimony, or Arsenic.

Pharmaceutist (Bristol).—See the Papers on "New American Remedies," by Professor Bentley, in the last three volumes of the Pharmaceutical Journal.

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, Bloomsbury Square.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VII.—No. VII.—JANUARY 1st, 1866.

MUNICIPAL REGULATIONS AFFECTING THE SALE OF POISONS.

In another part of this Journal will be found an account of the conviction of a druggist, and the infliction of a mitigated fine, for selling essence of bitter almonds without requiring the presence of a witness and entering the sale in a book. The subject has already attracted some attention and excited some surprise. When a notice of the occurrence first appeared in the newspapers, it was thought by many persons that the magistrates before whom the conviction took place had mistaken what was proposed, some years ago, to be enacted, for a law at present in operation. It was not generally credited that, according to any existing law in this country, a druggist was subject to a fine of five pounds for selling any virulent poison to any person except in the presence of a witness, and except entry be made in a book of the names and addresses of the purchaser and witness, together with the nature and quantity of the poison and the purpose for which it was intended. This certainly is not a law affecting the country generally, but it appears to be part of a local Act, called the Bolton Improvement Act of 1854. There are other places besides Bolton where similar clauses have been introduced into local Acts forming part of the municipal regulations of towns. The policy of legislating in this way with reference to the sale of poisons, was discussed some years ago in this Journal. In 1846 (Ph. Journ. vol. v. p. 535) reference was made to a proposed clause in the Stockport Improvement Act then before Parliament, to the effect "that every person who shall sell arsenic or prussic acid, *or any other well-known deadly poison*, to any person apparently under the age of twenty-one years, or to any person whatever, except in the presence of two witnesses, and without correctly entering in a book the name and address of such witnesses and person purchasing, as well as the quantity purchased, and the purpose for which it is intended, shall forfeit a sum not exceeding five pounds, to be recoverable as any penalty imposed by this Act." It was considered by the chemists of Stockport, and the Council of the Pharmaceutical Society fully coincided in this opinion, that the words in the above clause, printed in italics, could not be allowed to stand part of the Act without exposing the dealers in and dispensers of medicine to much annoyance and inconvenience; and on this ground the retention of those words was successfully opposed. In other respects the clause corresponds with one which exists in the Manchester Local Act, and we believe in other similar Acts. In the Bolton Act to which we have referred, the specific restrictions apply to the sale of *any virulent poison*, and questions might be raised as to what is a virulent poison, and also as to what constitutes the sale of such poison? Since the conviction of Mr. Goodman, a deputation from the Bolton District Association of Chemists and Druggists, consisting of Messrs. Blair, Dutton, Knott, Harwood, Hart, Terry, Payne, and Griffin, waited upon the Mayor for the purpose of conferring with him as to the discretionary power to be exercised in carrying this Act into operation. Mr. Dutton urged upon the Mayor that it was impossible to define what virulent poison was, and that if the Act were carried out to the letter, it would be impossible for chemists and druggists to carry on their business, as even the dispensing of most important medicines would be subject to the imposed restrictions. The Mayor asked the deputation what they wished him to do; and they replied that they wanted the magistrates, in any future case that might come before them, to consider the difficulty in which druggists were placed, and not to be strict in applying the law except in cases of gross neglect. We think the Bolton chemists have acted very judiciously on this occasion, and we only regret that they were not equally alive to their own interests when the local Act was passed in 1854. If it be necessary to provide for the public safety, in the sale of poisonous substances, by legislative enactment, this ought to be done by some well-considered general measure in which the interests of all parties are studied, and as far as possible protected, rather than by the partial, imperfect, and discordant legislation which local Acts, such as we have referred to, present.

THE BENEVOLENT FUND.

"The wealthy rarely fail
To find some reason why the poor deserve
Their miseries! Is it idleness, I pray you,
That brings the fever or the ague fit?
That makes the sick one's weakly appetite
From dry bread and potatoes turn away?
Is it idleness that makes *small earnings fail*
For growing wants?"—SOUTHEY.

A review of the proceedings connected with the Benevolent Fund during the year 1865 may be both profitable and appropriate at the commencement of a new year, and we think the retrospect cannot fail to afford satisfaction to the readers of this Journal.

In January last we pointed out the determination of the Council to bring the resources of this Fund into more active operation, their resolution to give the entire body of Members, Associates, and Subscribers the privilege of electing pensioners, and, in cases of extreme urgency, and within certain limits, to provide a Home by purchase in one of the National Orphan Asylums for the children of deceased Members. We also gave publicity to the regulations for carrying out those desirable objects that had been devised by a Special Committee, and adopted by the Council; and we strongly urged the duty of assisting the needy and the helpless who are connected with us, and of augmenting the means that are dedicated to the work of charity.

Let us see what has since been done.

1. The orphan child of a member (who had punctually paid his subscriptions

from the formation of this Society), has, by a payment of *one hundred guineas*, been provided with a home, board, and education in the British Orphan Asylum.

2. By a payment of *ten guineas* and (unpublished) contributions from individual members of the Council, the orphan child of another member has been assisted to a home in the same asylum, and to the like advantages mentioned in Case 1 (see Case 6).
3. The orphan daughter of a late member in Southampton has had a grant of *ten guineas.*
4. The family of a late member at Birmingham have had a grant of *five pounds* to assist in supporting their mother.
5. A distressed member and his family at Southampton have had a grant of *twenty pounds.*
6. The widow of a member at Sunderland, mother of the child whose case we have referred to (No. 2), has had a grant of *twenty-five pounds.*
7. A distressed member at Brighton received a grant of *twenty-five pounds.*
8. Two annuitants, one an old member from the commencement of the Society, and the other the widow of a late member (both highly meritorious cases), have been elected to pensions of *thirty pounds each.*
9. Two London members have received grants of *fifteen pounds each.*

Here, then, are the facts plainly before us. That the action taken by the Council had the very practical sanction of our readers has been clearly enough shown by the increase of subscriptions. That there are cases of dire distress among the families of those of our own calling is placed beyond the possibility of doubt. Evidence, painfully incontrovertible, exists to show that but for the help given by our Benevolent Fund during the past year, there were those who, having passed along the journey of life with an unspotted reputation to nearly the allotted period of threescore and ten, must have found refuge in the Poor House!

For many weeks one entire family subsisted upon bread and potatoes alone.

We implore the attention of our readers to these facts. They may rest assured that there is no exaggeration. They may feel equally assured of the readiness of the Council to minister to the wants of the necessitous, and the urgent need for larger funds being at their disposal.

Again and again, and once again, we beg those who have not yet associated themselves with the Benevolent Fund to aid in the good work. There are many of our body whose exertions have prospered, and who are blessed with liberal means. Have they all lent a helping hand? Are there none who, from sheer thoughtlessness, neglect this obvious duty? We sincerely hope that this appeal may fall under the observation of all who, from any cause, have held aloof, and yet can afford to give. May the present season and the time-honoured usages with which it is associated, stimulate kindly sympathies into practical exertion on behalf of the cause for which we plead, and enable us hereafter to report a generous and substantial addition to our treasury for the year one thousand eight hundred and sixty-six.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *December* 6*th*, 1865,

Present—Messrs. Bird, Bottle, Brady, Davenport, Deane, George Edwards, J. B. Edwards, Hanbury, Haselden, Hills, Mackay, Morson, Randall, Savage, Squire, and Waugh,—

Mr. Alfred Philip Garland, Blackburn, was elected a Member.

The sum of £500 was ordered to be invested to the General Fund account.

The sum of £30 was granted from the Benevolent Fund to two aged and distressed Members of the Society.

The case at Bolton, in which a Chemist was convicted and fined for selling Essence of Bitter Almonds without a witness, entry, etc., was referred to the Library and Museum Committee, with instructions to ascertain the particulars connected therewith, and to take such action as they may deem necessary.

EXAMINATION, 20*th December*, 1865.

MAJOR (Registered as Pharmaceutical Chemists).

Hanson, Thomas	Tamworth.
Strachan, John	Aberdeen.

MINOR (Registered as Assistants).

Allkins, Thomas Boulton	Tamworth.
Baker, Parson Custance	Holt.
Day, John	Retford.
Eve, Charles	London.
Jones, William	Shrewsbury.
Pullin, William Henton	Atherstone.
Sadgrove, Arthur Augustus	Faringdon.

REGISTERED APPRENTICES.

Name.	Residing with	Address.
Brearey, Robert Gawne	Mr. Brearey	Douglas, Isle of Man
Cooling, James	Mr. Cooling	Newark.
Cox, Edwin Joseph	Mr. White	Havant.
Kennett, John	Mr. White	Havant.
Lacell, Alfred Edward	Mr. Harrington	Rochford.
Langham, Henry John	Mr. Cupiss	Diss.
Maitland, John Edward	Mr. Maitland	London.
Rowntree, Joseph	Mr. Saville	Howden.
Skipper, Edward	Mr. Sims	Islington.
Smyth, Arthur William	Mr. Cupiss	Diss.
Stedman, Astley Nugent	Mr. Chignell	Wingham.
Walsham, William J.	Mr. Tupholme	London.

BENEVOLENT FUND.

SUBSCRIPTIONS* AND DONATIONS RECEIVED DURING THE YEAR 1865.

SUBSCRIPTIONS.—LONDON.

	£.	s.	d.
Allchin, Alfred, Barnsbury ...	0	10	6
A. M.	1	0	0
Anderson, Charles, 23, Lower Belgrave Street	1	1	0
Applegate, E., Upper Holloway	0	10	6
Argles, Charles, 1, East India Avenue, Leadenhall Street ...	1	1	0
Attfield, J., 17, Bloomsbury Sq.	1	1	0
Attwood and Hugill, 61, Cannon Street	1	1	0
Baker, Alfred P., Old Kent Road	0	10	6
Barnes, James B., Knightsbridge	0	10	6
Barron, Frederick, Bush Lane	2	2	0
Barron, Harvey, Beeket, and Simpson, 6, Giltspur Street...	2	2	0
Bentley, Robert, 17, Bloomsbury Square	1	1	0
Binge, Thomas, 23, Stockbridge Terrace	0	10	6
Bird, Augustus, Kensington ...	1	1	0
Bird, W. L., Castle Street, Oxford Street	1	1	0
Bishop, Alfred, Mile End New Town	2	2	0
Blake, Sandford, and Blake, 47, Piccadilly	1	1	0
Borchert, H. T. G., Dalston ...	0	10	6
Bourdas, Isaiah, 10, Pont Street	1	1	0
Bradley, John, St. John's Wood	0	10	6
Breton, Walter, 66, Cannon St.	0	10	6
Buckle, Christopher F., 77, Gray's Inn Road	0	10	6
Burgoyne and Burbidge, Coleman Street	2	2	0
Butt, E. N., 235, Oxford Street	0	10	6
Chubb, J. C., 59, St. John's St.	1	1	0
Clayton, F. C., 40, Aldersgate St.	0	10	6
Cocksedge, H. B., Bucklersbury	0	5	0
Coles, J., Camberwell New Rd.	0	10	6
Cooke, John, 171, Hoxton Old Town	0	5	0
Cooper, W. T., 26, Oxford St....	0	10	6
Cracknell, Charles, 107, Edgware Road	2	2	0
Croyden, C., 37, Wigmore Street	0	10	6
Darby and Gosden, 140, Leadenhall Street	2	2	0
Davenport, J. T., 33, Great Russell Street	2	2	0
Davenport, J. M., 33, Great Russell Street	2	2	0
Davies, Henry E., 43, Wood St.	0	10	6
Deane, Henry, Clapham	1	1	0
Dinneford and Co., New Bond Street	2	2	0
Dyson, W. B., South Kensington	0	10	6
Elvey, Thomas, Halkin St. West	1	1	0
Evans, J. H., Bartholomew Close	1	1	0
Falconer, Robert S., Walworth	1	1	0
Fenn, John T., Westminster ...	0	5	0
Fincham, Robert, 57, Baker St.	2	2	0
Fisher and Haselden, 18, Conduit Street	1	1	0
Flux, W., 1, East India Avenue, Leadenhall Street	1	1	0
Foott, Richard R., 8, Lower Eaton Street	0	10	6
Forrest, R., 9, Celbridge Place...	0	10	6
Fox, W., Church Street, Bethnal Green	1	1	0
Gadd, Charles, Vauxhall	0	5	0
Garden and Robbins, 372, Oxford Street	1	1	0
Gedge, W. S., St. John's Street	0	10	6
Goodbarne, Thomas, Hoxton...	0	10	6
Goodger, David, 31, Regent St.	0	10	6
Goodwin, John, Lower Clapton	0	10	6
Goosey, William, 6, Ocean Row	0	10	6
Gorton, J. G., 144, High Street, Whitechapel	0	10	6
Griffiths, J., Clerkenwell Green	0	10	6
Gristock, Thomas, 42, South St.	0	10	6
Groves, E., 4, Bernard St., N.W.	0	10	6
Hanbury, D. B., Plough Court.	1	1	0
Herrings and Co., Aldersgate St.	2	2	0
Hickley, T. P., Edgware Road	0	10	6
Hill and Son, 11, Little Britain	2	2	0
Hills, Thomas Hyde, 338, Oxford Street	1	1	0
Barnard, John .... do.	0	10	6
Gale, Samuel .... ,,	0	10	6
Middleton, Francis ...... ,,	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

* Subscribers of half-a-guinea are entitled to one vote; of one guinea, two votes; and to increase in the same proportion.

	£.	s.	d.
Millar, Frederick C. M., 338, Oxford Street	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
Hodgkinson, Tonge, and Stead, 213, Upper Thames Street ...	2	2	0
Hooper, Bartlett, 43, King William Street	0	10	6
Hopkin and Williams, 5, New Cavendish Street	2	2	0
Horncastle, John, 12, Stanhope Terrace	0	10	6
Howell, T., Camden Town	0	10	6
Howell, Maurice, Peckham ...	0	10	6
Huxtable, John, St. John's Street Road	1	1	0
Jackson, J., 83, Southampton Row	1	1	0
Johnson, Benj. M., 70, Tottenham Court Road	0	5	0
Kemp, Robert, Holloway Road	0	10	6
Kendall, Charles F., Clapham	0	10	6
Kent, T., 226, Blackfriars Road	0	10	6
Kernot, George Charles, Poplar	0	10	6
Kershaw, George, Camden Town	0	10	6
Large, J. H., 65, New North Road	0	10	6
Lescher, Joseph S., Bartholomew Close	1	1	0
Low, W. Francis, Wimpole St.	1	1	0
Mathews, Wm., 1, Wigmore St.	0	10	6
Maw, S., and Son, 11, Aldersgate Street	2	2	0
May, John, Battersea	0	10	6
Merrell, James, Camden Town	0	10	6
Mitchell, John, Upper Street, Islington	0	10	6
Moore, J. L., 1, Craven Place...	0	10	6
Morris, Henry, St. John's Wood	1	1	0
Morson, T. N. R., 38, Queen's Square	1	1	0
Morton, George, Stratford	1	1	0
Mould, S., 21, Moorgate Street	0	10	6

	£.	s.	d.
Nicholson, Frederick, Highbury	1	1	0
Orpe, T. M., 329, Old Kent Road	0	10	0
Orridge, B. B., 30, Bucklersbury	1	1	0
Palmer, Robert, Ovington Sq.	1	1	0
Penrose, A. W., 7, Amwell St.	0	10	6
Peppin, Sydenham H., 25, Princes Street	0	10	6
Pollock, T., 129, Fenchurch St.	1	1	0
Pratt, E., 27, Bishopsgate Street	1	1	0
Quiller, Charles R., Sloane Sq.	0	10	6
Roach, Pope, St. James's Street	0	10	6
Roberts, A. J., Walworth	0	10	6
Shirley, John G., 1, Westbourne Grove	1	1	0
Sims, J. F., Hemingford Place	0	5	0
Smith, William F., Walworth	0	10	6
Snelling, Francis, 23, Farringdon Street	1	1	0
Sparks, John, 147, Offord Road	1	1	0
Starkie, Richard S., 4, Strand...	1	1	0
Stathers, J., 43, Norland Road...	0	10	6
Stocken, James, 13, Euston Sq.	0	5	0
Tibbs, F., 47, Blackfriars Road	0	10	6
Tilburn, Robert J., 223, Gray's Inn Road	0	5	0
Tippett, Benj. M., 3, Sloane St.	0	10	6
Tupholme, John T., 38, Lamb's Conduit Street	0	10	6
Turner, C. E., Great Russell St.	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
Walker, Henry, 44, Bernard St.	1	1	0
Whitburn, Augustus R., 174, Regent Street	0	10	6
White, Daniel, 19, Park Terrace	1	1	0
Williams, Joseph J., Harrow Rd.	0	10	6
Wilson, Thos., Upper Holloway	0	10	6
Windle, Wm., 48, Portland Pl.	0	10	6
Wood, Edward, Westminster Hospital	0	10	6
Wooldridge, J., 290, Euston Rd.	0	10	6
Wright and Co., 11, Old Fish Street	1	1	0
Wyman, John, 122, Fore Street	1	1	0
Young, George, Millwall	0	5	0

Subscriptions.—Country.

	£.	s.	d.
Abergavenny, Ackrill, George	0	5	0
Aldeburgh, Owles, Edward J. ..	0	10	6
Ashby-de-la-Zouch, Redfern, J.	1	1	0
Axbridge, Hallam, Edward	1	1	0
Barnstaple, Goss, Samuel	0	5	0
Bath, Pooley, John C.	0	5	0

	£.	s.	d.
Berwick, Carr, William	0	10	6
Beverley, Robinson, James Mowld	0	5	0
Birmingham, Musson, T. G. ...	0	10	6
„ Palmer, C. F.	0	10	6
„ Pegg, Herbert ...	0	10	6

	£.	s.	d.
Birmingham, Southall, Son, and Dymond	1	1	0
Bishop Stortford, Grounds, G. F.	0	10	6
Blandford, Groves, W. E.......	0	10	6
Bradford, Rogerson, Michael...	1	1	0
Bridge, Thomas James	0	5	0
Bridgnorth, Deighton, Thos. M.	2	2	0
Brighton, Cornish, William ...	0	5	0
,, Gwatkin, James T....	0	10	6
,, Noakes, Richard......	0	10	6
,, Robson, Thomas......	0	10	6
,, Savage, William D.	0	10	6
Bristol, Butler, Samuel	0	10	6
,, Hodder, Henry	0	5	0
,, Sircom, Richard	0	5	0
Broadstairs, Doubell, James ...	0	5	0
Bromley, Baxter, W. W.	0	10	6
Carlisle, Sawyer, James	0	5	0
,, Sowerby, John	0	10	6
Cheltenham, Proekter, R. E....	0	10	6
Chertsey, Boyce, John Pierce...	0	5	0
Chichester, Dale, Geo. Wm. ...	0	5	0
,, Pratt, John	0	10	6
Cockermouth, Bowerbank, Jsph.	1	1	0
Coningsby, Brown, Samuel......	0	5	0
Crewkerne, Strawson, Henry ...	0	10	6
Crickhowell, Christopher W. ...	0	5	0
Croydon, Long, Henry	0	5	0
Dartford, Edwards, George ...	1	1	0
Denbigh, Edwards, William ...	0	5	0
Deptford, Lockyer, George ...	0	10	6
Devizes, Madge, Jas. C.	0	5	0
Diss, Cupiss, Francis	0	10	6
Dover, Bottle, Alexander	1	1	0
Dudley, Hollier, Elliott	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	6
,, Macfarlan and Co.	1	1	0
,, Mackay, John	1	1	0
,, Raimes and Co. ...	1	1	0
,, *Portobello*, Kemp, David	0	10	6
Exeter, Bromfield, Charles......	0	5	0
,, Cooper, George	0	10	6
,, Husband, Matthew ...	0	10	6
,, Palk, John	0	10	6
,, Stone, John	0	5	0
,, Tanner, Nicholas W....	0	5	0
Exmouth, Thornton, Samuel ...	0	10	6
Fareham, Peat, Walter	0	5	0
Faringdon, Ballard, Edwin ...	0	10	0
Gloucester, Hurst, Wm. F. H.	0	5	0
Gravesend, Spencer, Charles ...	1	1	0
,, Beaumont, W. H.	1	1	0
Harleston, Muskett, James ...	0	5	0
Hartlepool, Farrar, Wm.	0	5	0

	£.	s.	d.
Harwich, Bevan, Charles F. ...	0	5	0
Hay, Davies, John L.	0	5	0
Heavitree, Brailey, Charles ...	0	5	0
Hereford, Hustwick, Thos. H.	0	5	0
Hirwain, Sims, Joseph	0	10	6
Horsham, Williams, Philip ...	0	10	6
Hull, Baines, James	0	10	6
Ilford, Beal, Edmund John ...	0	10	6
Ingatestone, Stuart, Henry J.	0	10	6
Ironville, Greaves, Abraham ...	0	10	6
,, Greaves, Wm. Saml.	0	5	0
Kaffraria, Daines, Thomas ...	0	10	6
Kendal, Bateson, Thomas	0	10	6
Kidderminster, Bond, Charles	0	5	0
Kilmarnock, Borland, John ...	0	10	6
,, Rankin, William	1	1	0
Leeds, Brown, Edward	0	10	6
,, Harvey and Reynolds ...	1	1	0
Lincoln, Tomlinson, Chas. K....	0	5	0
Liverpool, Angior, John	1	1	0
,, Edwards, J. B.	1	1	0
,, Evans, Son, and Co.	2	2	0
,, Evans, H. Sugden...	2	2	0
,, Mercer, Nathan......	0	10	6
,, Thompson, John ...	0	10	6
,, *Waterloo*, Pheysey, R.	1	1	0
Llangollen, Jones, Humphrey	0	5	0
Ludlow, Cocking, George	0	5	0
Maidstone, Argles, Robert	0	5	0
,, Kirk, John	0	5	0
,, Rogers, William ...	0	5	0
Manchester, Benger, F. B.... ..	0	5	0
,, Carter, William ...	0	10	6
,, Halliday, W. J. ...	0	10	6
,, Hayward, Charles	1	1	0
,, Jackson, Thomas	0	10	6
,, Mitchell, John ...	0	10	6
,, Paine, Standen ...	0	5	0
,, Walsh, Edward ...	0	10	6
,, Wilkinson, William	0	10	6
,, Wright, Charles ...	1	1	0
Monmouth, Dawe, Sampson ...	0	10	6
Nailsworth, Mason, W. W. ...	0	2	6
Newcastle, Brady, Henry B. ...	1	1	0
,, Procter, Wm.	1	1	0
Newcastle-u.-Lyne, Cartwright, William	0	10	6
Norwich, Arnold, Edward	0	5	0
Nottingham, Jenkins, Joseph ...	0	10	6
Odiham, Hornsby, John H. ...	0	10	6
Oldham, Bagshaw, William ...	1	1	0
Otley, Pratt, Richard M.	0	10	6
Oxford, Prior, George T.	0	10	6
Pembroke Dock, Saer, David P.	0	10	6
Portsmouth, Parsons, William	0	10	6
Preston, Hogarth, William......	1	1	0
Putney, Farmer, John...........	0	5	0

	£.	s.	d.
Ramsgate, Morton, Henry	0	5	0
Richmond, Mumbray, R. G. ...	0	10	6
Rochdale, Mercer, Thomas Wm.	0	5	0
Rhyl, Jones, Ellis P.	0	10	6
Ryde, I. W., Gibbs, William ..	0	10	6
,, ,, Taylor, Richard ...	0	10	6
Salford, Manfield, John W. ...	0	5	0
Scarborough, Whitfield, John...	0	10	6
Shaftesbury, Powell, John	0	10	6
Shildon, Veitch, William	0	10	6
Sittingbourne, Gordelier, Paul William Gibbs	0	10	0
Slough, Griffith, Richard	2	2	0
Southampton, Randall and Son	1	1	0
Southsea, Rastrick and Son ...	0	10	6
Sowerby Bridge, Stott, Wm. ...	0	5	0
Stamford, Patterson, George...	0	10	6
Stockport, Brooke, Frederick...	1	1	0
,, Hunt, Thomas	0	10	6
,, Shaw, Alexander H.	1	1	0
Stourbridge, Bland, John H. ...	0	10	6
,, Nickolls and Perks	0	3	6
St. Albans, Roberts, Albinus ...	1	1	0
St. Leonard's, Maggs, S. B. ...	1	1	0
Strood, Picnot, Charles	1	1	0
Sydenham, Pocklington, James	0	10	6
Tenterden, Bolton, Thomas ...	0	5	0
,, Willsher, S. H.	0	10	6
Thame, Booth, Samuel	0	10	6
Thornbury, Ellis, Richard	0	5	0
Thornton-in-Craven, Wilson, Thomas..........................	2	2	0
Tickhill, Crowther, Thomas ...	0	10	6
Torpoint, Down, Richard H. ...	0	10	6
Torquay, Whiteway, W. H. ...	1	1	0
Tunbridge Wells, Gardener, C.	0	5	0
,, Sells, Robert J.	0	5	0
Wandsworth, Nind, George ...	0	10	6
Weaverham, Manifold, John J.	0	10	6
Wellingborough, Thorne, John	0	5	0
Weymouth, Groves, Thomas B.	0	10	6
Winchester, Hunt, Richard ...	1	1	0
,, Powell, Edward ...	0	10	6
Windsor, Russell, Charles J. L.	0	10	6
Wingham, Chignell, Alfred......	1	1	0
Wolverhampton, Hamp, John	0	10	6
Woolwich, Bishop, Thomas ...	0	10	6
,, Parkes, John C.......	0	10	6
,, Rastrick, John A....	0	5	0
Wymondham, Skoulding, W....	0	5	0
Yarmouth, Bond, John	0	5	0
York, Linsley, Thomas	0	5	0

Donations.

	£.	s.	d.
Argles, Son, and Stonham, *Maidstone*	5	5	0
Atkins, Francis Thomas, *Deptford*	2	2	0
Bailey, Delamore J., 30, Conduit Street	5	5	0
Gamble, Richard, *Grantham*	5	5	0
Garle, John, *Bromley, Kent*	5	5	0
Goddard, Joseph, *Leicester*	5	5	0
Hearon, M'Culloch, and Squire, 5, Coleman Street	10	10	0
Holt, William Henry, *Altrincham*	5	5	0
Horner and Sons, 20, Bucklersbury	10	10	0
Lea and Perrins, *Worcester*	50	0	0
Maw, Charles, 11, Aldersgate Street	10	10	0
Newbery, Francis, and Sons, St. Paul's Churchyard ...	10	10	0
Spokes, Peter, *Reading*	5	5	0

Croft, George	1	1	0
Headland, Alfred	1	1	0
Palin, Benjamin	1	1	0
Smith, J. H. and E. R.	1	1	0

BENEVOLENT FUND ACCOUNT FOR THE YEAR 1865.

	£ s. d.	£ s. d.		£ s.	£ s. d.
Subscriptions	215 15 0		Member and family, late at Southampton		20 0 0
Donations	135 1 0	350 16 0	An Orphan Daughter at Southampton		10 0 0
Dividends		189 9 11	Widow of a Member at Sunderland	25 0	
			Do. second grant, to assist in getting her child into the British Orphan Asylum	10 10	35 10 0
			Purchase of one of the orphans of the late William Bentley, London, into the British Orphan Asylum		105 0 0
			Premium of assurance on his life		1 11 2
			Member at Brighton		25 0 0
			Widow of a late Member at Birmingham		5 0 0
			Two London Members £15 each		30 0 0
			First Quarter's Annuities to Mrs. Goldfinch and Mr. David Peart		15 0 0
			Printing and Stationery		19 15 6
			Postage		11 5 6
			Advertisements		1 13 6
			Sundries		0 10 3
			Purchase of £290 11*s.* 4*d.* Consols		260 0 0
		£540 5 11			£540 5 11

Invested in Consols, 31st December, 1864	6,440 5 4
Purchase of Consols, as above	290 11 4
	£6,730 16 8

PHARMACEUTICAL MEETING.

Wednesday, December 6th, 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 Educational Times.
The Medical Circular.
The Chemical News.
The Chemist and Druggist.
The Photographic Journal.
The Technologist.
The Assurance Magazine. From the respective Editors.
The Journal of the Chemical Society.
The Transactions of the Botanical Society of Edinburgh.

The Proceedings of the Pharmaceutical Conference, 1865. From the respective Societies.

Manual of Materia Medica and Therapeutics, being an Abridgement of the late Dr. Pereira's Elements of Materia Medica. Edited by Dr. Farre, Professor Bentley, and R. Warington. From Professor Bentley.

The Magic Lantern, How to Buy it and How to Use it.

On the Successful Treatment of Flatulence, by a Novel Use of Charcoal. By Arthur Leared, M.D. From the Authors.

Copland's Dictionary of Practical Medicine. From the Publisher.

Lectures on Physiology, Materia Medica, and Practice of Physic. By George Fordyce, M.D. Manuscript. Transcribed by Jonathan Middleton for the late William Allen. From Mr. Daniel Hanbury.

Dried specimens of *Nicotiana persica.* From Mr. Squire.

Specimens of Essential Oils, Gums, Resins, etc., obtained from the native plants of Victoria, Australia, and exhibited at the Dublin International Exhibition. From Mr. Joseph Bosisto, of Melbourne.

COD-LIVER DRAGÉS.

Mr. Squire called the attention of the meeting to the composition of the watery extract obtained from cod-livers. He had brought with him the extract resulting from the evaporation of the water which oozes out of the cod's liver when extracting the oil. He finds that on the average 28 pounds of large and fresh livers yield 12 pounds of oil and 2 ounces of aqueous extract resulting from the evaporation of the water. It had been represented in the advertisements of a medicine called *Cod-liver Dragés,* that 5 grains of the purified extract equalled a tablespoonful of cod-liver oil. It was this startling announcement that induced him to have the water collected and evaporated, in order that the members of the Society might examine the product and judge for themselves, and if it was thought worth while to have it analysed in their laboratory. He thought it was highly important to know whether or not we were throwing away so valuable a part of the livers as this statement indicated.

A gentleman who attended from Messrs. Newbery's, explained that the cod-liver extract was in no wise a secret or quack remedy. The method by which it was prepared, he said, had been patented, and he read the specification of the first of the two patents taken out by the proprietors.

Mr. Squire wished to know how the value of the extract was estimated, so as to compare it with the value of the cod-liver oil.

It was explained in reply that the amount of extractive and inorganic matters yielded by a given amount of the oil, and supposed to be the same as those contained in the extract, give the means of determining the relative value of the oil and extract.

Dr. Attfield said he would not shrink from making the analysis suggested by Mr. Squire; but he thought the question one on which chemistry could throw but little light. It was a matter for physicians, who observed the effects of medicines, to decide.

Mr. Deane thought it was no business of the Pharmaceutical Society to take up the analysis of proprietary medicines. If one was alleged to be poisonous or dangerous, it was another matter; but in general it was no part of the Society's business to expose nostrums.

Mr. Squire replied that he had no wish to expose nostrums. In the present case it was asserted that this extract, which was usually thrown away, was much superior to the oil which was preserved, and he thought it of importance to establish the truth or falsehood of this assertion.

Dr. Edwards contended that the discussion was one which the Society could not enter upon. They could not decide upon the therapeutic value of a medicine.

The CHAIRMAN suggested that Mr. Squire should induce a medical friend to make some experiments with the extract, and report the results to the Society.

NOTE ON THE PRESERVATION OF THE OXIDE OF MERCURY OINTMENT.

BY THOMAS B. GROVES, F.C.S.

I am surprised to observe that neither Mr. Barber nor those who discussed his paper, appear to have remembered anything of my experiments on the preservation of oxide of mercury ointment, a detail of which, under the title of "Rancidity of Fats," was presented to the Bath meeting of the British Pharmaceutical Conference.

I there pointed out that the addition of a minute quantity of certain essential oils would entirely prevent both reduction of oxide and rancification of the fatty excipient.

I have just examined some specimens I made December 5, 1861, and find that several of them are looking as well as ever, and have no smell of rancidity. Those perfumed with clove or pimento, two drops to the ounce, keep best,—in fact, seem everlasting. Pimento is in my opinion to be preferred for many reasons, to clove. I have added that oil to ceratum calaminæ and ung. zinci also, with the best results, but the latter must be made with Hubbuck's oxide, in consequence of the P. L. preparation striking with the oil a faint yellow colour.

I may add that my customers have never complained of, nor indeed noticed, that I am aware of, the odour of these ointments, the medical effects of which are in no way modified by aromatization.

Weymouth, December 4, 1865.

Mr. REYNOLDS, of Leeds, exhibited a very beautiful collection of models of fungi, which he had obtained from Paris. They were of Italian manufacture, and very correctly illustrated all the different varieties of fungus that were found in different countries.

OBSERVATIONS AND EXPERIMENTS ON THE PHYSICS OF FILTRATION.

BY JOHN ATTFIELD, PH.D., F.C.S.,

Director of the Laboratories of the Pharmaceutical Society of Great Britain.

One, somehow, generally associates nature with the country; and truly there is much excuse for so doing, for in towns one is so surrounded with the productions of the art of man, and one's mind is so occupied with one's daily pursuits that leaves and flowers and the starry sky are seldom thought of, and by reason of the dust and smoke we raise, still less seldom seen. And of all the busy workers in such centres of industry but few, perhaps, are so tied to their post as those who follow the calling of Pharmacy. Yet even the chemist and druggist may find nature's laws as truly and beautifully governing the chemical changes he induces, and the physical operations he performs, as they do the springing blade, the ripening fruit, the lightning's flash, or the course of the sun itself. He may not have much opportunity of finding "books in the running brooks," yet in the flow of water from his filter he may discover laws identical with those which produce the cool spring in the valley or the rushing torrent of the mountain side. Let us, at this time, go no further than the one simple operation I have just alluded to; we may find but little to interest us in passing a few ounces of water or other liquid through a paper cone, but when we come to operate on a larger scale, and, as aids to rapidity of filtration, use those various appliances which have been suggested from time to time during the past fifty years, we shall find ground for much thoughtful contemplation, and some room for experimental inquiry. The result will, I hope, be useful and interesting not only to the pharmaceutist, but to the hydraulic engineer and to physicists generally.

Introduction.

The nature of the operation of filtration, as usually conducted, is so simple that but little has been or need be published concerning it. The variety of circumstances under which filtration is conducted, as well in social as in commercial life, has given rise to many contrivances for effecting the operation; filtering materials are numerous, the forms of the vessels designed to hold the materials scarcely less numerous, and the arrangements to facilitate and perpetuate filtration many and ingenious; but the nature of the operation, as distinguished from the operation itself, is the same, or nearly so, under all ordinary circumstances. Indeed, its nature is identical with that of some operations which, conventionally, are quite distinct from filtration, and which are always spoken of by other names. In the process termed sifting we have the same action occurring as in filtration; it might, in fact, be called "dry-filtration."* In the netting of fish we also have the same action. Again, the operation of "straining" even still more closely resembles that of filtration. The nature, then, of the operations conducted with filters, strainers, sieves or nets is identical; the operations themselves quite distinct, and, very properly, called by different names. What I wish to speak of now is not the operations themselves but their nature, that is, the laws which regulate their action, especially in respect to filters.

Nature of the Operation of Filtration.

In filtration, straining, and net-fishing we desire to separate certain solid matters from certain liquids; and in sifting we desire to separate solid bodies of one size from solid bodies of another size. How do we proceed? As follows. We place our mixed materials under the influence of gravitation, interposing in their path a medium (called a filter, a strainer, a net, or a sieve, according to circumstances) which arrests the gravitation of one portion of the materials but does not interfere, or only temporarily impede, the gravitation of the other portion. This, then, is the general nature of the operations as they are usually conducted, and it is exceedingly simple.

Resistance of Filtering Media.

The extent to which a medium impedes gravitation depends upon the degree of porosity of that medium. A fishing-net even of unusual smallness of mesh cannot, obviously, retard gravitation of water to any extent that can be appreciated. Indeed, I find that one thickness of common coarse flannel allows a

* Similarly "filtration" might be called "wet-sifting."

stream of water to run through it almost as fast as a similar stream falls in air. A piece of such flannel was fitted into a funnel-shaped vessel having a capacity of ten ounces; it allowed of the passage of half a pint of water in nearly the same number of seconds, as when there was no flannel. Similar experiments might have been performed with other filtering media (unsized paper, unsized calico, cotton-wool, gun-cotton, linen, tow, flannel, woollen cloth, felt, sponge, charcoal, sand, gravel, powdered glass, porous stone, biscuit-earthenware, asbestos, and the "filtering-powders," such as fuller's earth, used for the special purpose of decreasing the porosity and therefore increasing the resistance of other media), and thus, if the same area of filtering surface, and a similar quantity of water were used in every case, the time occupied in the transit of the water become a measure of the resistance offered by each medium. Such a table of the rate at which fluids pass through different kinds of organic and inorganic filtering materials would, however, afford us but little more knowledge than experience gives already. It would do no more than vaguely indicate the porosity of the media; and even that only for the particular pieces of paper, cloth, etc., used during the passage of the particular liquid operated on. For the rapidity of filtration through any one given medium will greatly depend on the mobility or viscosity, etc., of the gravitating fluid. Again, even the same piece of filtering medium, especially such media as black woollen cloth, will, I find, retard the passage of pure water to a considerably greater extent after it has been in use some hours than it did at first: this is doubtless due to the swelling of the material and consequent diminution in the size of its pores. Then the pores of a filter will, in practice, generally become choked to an unknown extent by the solid matter of the filtering mixture. Indeed, not unfrequently the filtering medium with which filtration is commenced is known to be insufficient to effect the operation contemplated, success depending on the deposition of solid matter on the medium: in this case the filtrate is at first turbid, and only becomes clear on being passed and repassed through the medium. When this occurs the filtering medium is no longer the mere paper, cloth, etc., that was first used, but composed of a mixture of that material with an unknown quantity of the solid matter deposited. Rapidity of filtration is also influenced by the form given to the filtering medium and to the vessel in which that medium is enclosed.

Aids to Filtration.

I have said that the nature of the operation of filtration is nearly identical in all cases. It is not quite so. In our kitchens, and, indeed, in the shops of those chemists and druggists (and there are too many) who make few if any of the preparations they sell, filtration is never extended beyond the paper cone or the jelly-bag. And even in the busiest laboratory the operation is only occasionally extended beyond that limit. Hence the nature of filtration is in nearly all cases equally simple, and scarcely needs explanatory comment or experimental investigation; but when mere gravitation is insufficient to effect the object contemplated, or to effect it in a reasonable length of time, then additional force must be employed to drive the liquid portion of a mixture through the medium designed to receive the solid portion. The mixture is therefore put into a proper receptacle, and the whole subjected to (*a*) *hand-pressure*, (*b*) *lever- or screw-pressure*, (*c*) *hydraulic pressure*, (*d*) *atmospheric pressure*, (*e*) *hydrodynamic force*, or to *a combination of these forms of pressure*. The elucidation of the nature of the operation of filtration in which gravitation is aided by one form of the last-mentioned of these means, was the object I originally had in view in undertaking some of the experiments mentioned in this paper. The result convinced me that the general notions concerning the nature of the action of some of the other means, and of other forms of that means, were erroneous. I therefore determined to write a paper embracing the theoretical aspect of the whole question, firstly, for the benefit of those who, like myself, pursue natural truth *con amore*, and, secondly, in the hope that those who, like myself, have occasionally to use aids to filtration, might do so with the maximum of economy and efficiency.

(*a*) *Filtration in which Gravitation is aided by Hand-pressure.*—When a closed filter-bag containing a mixture to be filtered is pressed between the hands, the muscular force of the operator aids the natural gravitating tendency of the fluid portion of the mixture to an extent dependent on the amount of muscular force exerted. Moreover, that pressure, though not the full amount of it, is also exerted upon every similar sized portion of the whole bag. For instance, if the two hands cover a space of fifty square inches, and the whole bag presents a surface of five hundred square inches, then the total amount of muscular force exerted upon the whole bag will be a quantity more or less approaching ten times the amount of force actually exerted by the two hands. This conveyance and multiplication of force is in obedience to well-known laws of hydrostatics, namely, that "pressure is transmitted by fluids in all directions: the transmitted pressure is equal in every portion of the fluid: it is proportional to the area of the surface pressed." Notice, however, that the aid which gravitation receives in hand-pressure on a filter-bag is correctly spoken of as muscular aid, not hydrostatic aid; for hydrostatics is a branch of science that relates to or embraces the properties which fluids possess when they are in a state of rest, whereas the very essence of the act of filtration is the motion of the fluid; filtration involves motion; where there is no motion there is no filtration. Filtration is therefore a property of fluids more properly embraced by hydrodynamics than by hydrostatics. In hand-pressure the *conveyance* of the muscular force of the hands to the parts of the bag not touched by the hands, is a hydrostatical matter, not so the force itself or the filtration which results. The fact is that owing to the escape of liquid from the pores of such a pressed bag, hydrostatic laws can never come into full operation inside the bag. When the flow is one of drops, the pressure inside approaches pure hydrostatic pressure, and when the flow ceases altogether the pressure inside *is* pure hydrostatic pressure. But in proportion as the flow is more and more rapid, so the amount of pressure inside the pressed bag is less and less hydrostatic, and the extent to which the gravitation of the liquid is aided, becomes more and more in accordance with the rate at which the motion of all gravitating bodies is accelerated.

(*b*) *Filtration in which Gravitation is aided by Lever- or Screw-pressure.*—When a closed filter-bag containing a mixture to be filtered is pressed in an instrument similar to that familiar one termed a "lemon-squeezer," or in the scarcely less familiar apparatus known as a "screw press," the force aiding gravitation is still muscular force. In this case, however, the force is conveyed and multiplied first by a lever or levers to the bag, and then to every part of the filtering mixture by the hydrostatic means just described. As, however, the aid is more powerful than in mere hand-pressure, it is conveniently, for distinction, spoken of as a lever- or screw-pressure.

(*c*) *Filtration in which Gravitation is aided by Hydraulic-pressure.*—When a closed filter-bag containing a mixture to be filtered is pressed in Bramah's well-known hydraulic press, the force aiding gravitation is still muscular force. But in this case the force is conveyed and multiplied by a lever whose point of resistance is a column of water; thence, through that column, to a column of much larger area contained in a strong cylinder having a moveable piston; against the under surface of the piston the augmented force, now again many more times augmented by this hydrostatic arrangement, acts with such effect as to drive the piston forward with immense power; and thus, more strongly than in any other arrangement, pressure is exerted upon any filter-bag which may be placed between the end of the piston and any rigid and immoveable surface. The manner of the conveyance of this great pressure to every part of the filter-bag (by hydrostatic means), has already been described in treating of hand-pressure. For this form of pressure, cause and effect being dynamical, and the means which link cause with effect being statical, no term could be more appropriate than "hydraulic."*

(*d*) *Filtration in which Gravitation is aided by Atmospheric-pressure.*—Two filters of this kind were proposed by Mr. G. Field at the Society of Arts, more than fifty years ago (Nov. 1, 1814; Trans. Soc. Arts, vol. xxxiv. p. 87). His drawings represent the filtering medium as fixed to the inner sides of a large tub at a point somewhat nearer the bottom than the top. The filtering mixture being placed on the medium, a portion of the air enclosed below was removed by a well-made pump, when of course the natural pressure of the atmosphere, previously exerted below as well as above, came into operation on the upper surface only of the mixture; or the tub was turned upside down, the filtering mixture poured into the closed chamber through an opening which was then closed, and air then pumped into the space between the surface of the mixture and the bottom (now the uppermost part) of the tub.

Steam has also been used in the place of air to exert pressure on the upper surface of a filtering mixture.

A "vacuum-filter," smaller than Mr. Field's, and more conveniently constructed, is described and figured in the 'Practical Pharmacy' of Drs. Möhr and Redwood, p. 205.

A new method of applying atmospheric pressure as an aid to gravitation in the operation of filtration has recently been proposed by Dr. Piccard.† A filtering medium is attached to the inside of a funnel, or other vessel, in the manner just described; the neck of the funnel is fixed by a cork into one of the two necks of a Wolff's bottle; from the other neck a flexible or other tube is carried to a water aspirator.‡ A partial vacuum is in this way produced below the filtering medium, when at once the natural pressure of the atmosphere manifests itself on the exposed surface of the filtering mixture.

In each of the above instruments the atmospheric pressure developed aids the gravitating tendency of the fluid portion of the mixture, and the rapidity of filtration is augmented to a certain extent.

Practically, these atmospheric-pressure filters have less value than was at first anticipated; but that fact may be passed over here, as the usefulness of filters,

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* Bramah's Press has, by a few writers, been termed a hydrostatic machine; and, at first sight, this would seem to be a legitimate name, seeing that the means of enormously multiplying force which it possesses are partly hydrostatic means. But the effect is also partly due to the use of levers. Besides this, whatever useful effect the machine may produce is a dynamical effect, and the primary cause of that effect is also dynamical. Hydraulic, therefore, is a better term, because hydraulics, etymologically at all events, only relate to the properties of water in pipes (ὑδωρ, water, and αυλος, a pipe), and include neither or both statical (στατος, static or standing) and dynamical (δυναμις, power or force) matters. Messrs. Bramah originally named their instrument a "Hydromechanical Press," and it was so called for many years; I consider that name a better one for it than even the term "hydraulic."

It is to be regretted that the effects termed dynamic, are not described by a word which would more powerfully convey idea of "unrest," which that term is supposed to indicate.

† 'Zeitschrift für Analytische Chemie,' part 1, vol. iv., and 'Chemical News,' vol. xii. p. 180.

‡ A water aspirator is simply a T-shaped tube, whose horizontal portion is of greater diameter than the vertical part. Water is conveyed from a cistern through the wider portion of the tube. As the water passes the point where the narrower tube is inserted, it sucks in air, or, in more precise terms, the friction of descending fluid particles against those (gaseous or liquid) in the side tube is sufficient to involve the latter in the current of the former. In this way vacua, as good as those of the barometer, have been produced. (See also Sprengel's "Researches on the Vacuum," Journal of the Chem. Soc., vol. xviii. p. 9.)

though an important subject, is not at the present moment under discussion, their mode of action only is what we are now considering.

(*e*) *Filtration in which Gravitation is aided by Hydrodynamic-force, or by an apparent combination of Hydrodynamic-force with Hydrostatic-pressure, or with Aerostatic- (Atmospheric-) pressure.*—Filters have been proposed in which the rate of flow has been augmented by the use of a column of liquid above or below the medium. To understand the nature of the action in these instruments it will be necessary to trace that action to its sources. When water is poured into a long glass or other tube, uniform diameter, closed at one end, say by a flat glass plate by means of proper cement, the natural gravitation of the water will exert a pressure on the bottom of the tube. The amount of this pressure will clearly depend upon the amount of water in the tube. If there is one pound of water in the tube it will be a pressure of one pound, if two pounds, two pounds, and so on. If the first pound of water form a column a foot long, then the addition of every foot to the column will increase the pressure by one pound. The pressure will increase in proportion to the *simple* length of the column. Such a pressure is properly called "hydrostatic," because produced by "water in a state of rest." But now let the bottom of the tube be a filtering medium, instead of an impervious plate—let it be flannel or common black coat cloth; and, to keep up analogy with the previous experiment, let the water as it runs through the medium be so replaced by more as to maintain the column at one, or two, or three, or four feet in length. It will then be found that the amount of water which will run through the filtering medium in a given time when the column is a foot long is not doubled when the column is two feet long. The amount is certainly increased when the height of the column is doubled, but not to the extent it would be increased if the increase were proportionate to the hydrostatic pressure. The actual extent to which it is increased depends entirely upon the amount of resistance which the filtering medium offers to the passage of the liquid. I find that if the resistance is so great that the liquid passes more or less in the state of drops, then the amount obtained from a four-feet column certainly does approach to nearly four times the amount obtained from a one-foot column of liquid. In one experiment, in which four ounces of water filtered through some closely packed sponge, when the column of water above the sponge was one foot high, fifteen ounces passed when that column was lengthened to four feet. This was a close approximation to an effect proportionate to the hydrostatic pressure inside the vessel. It is conceivable that when filtration in such a tube becomes so slow that a liquid only passes in drops, then the pressure of the whole column of liquid, having, so to speak, time to accumulate, exerts itself on the particles of liquid near the medium with *nearly* its full hydrostatic power; and that at that moment any particle actually at the mouth of a pore of the filtering medium, being unequally pressed on all sides, being forced down by hydrostatic pressure, and being opposed from below only by the capillary attraction of the pore, is forced in the direction of least resistance—in other words, shot through the pore with a velocity nearly proportionate to the hydrostatic pressure above, minus the capillary resistance of the pore. Let me not be misunderstood here. I mean to say, that inasmuch as a filter in an inactive state with a certain column of liquid above the medium becomes active, that is, in a state of flow when the length of the column is increased, it is obvious that the flow in the latter case is set up by hydrostatic pressure. And the rate of flow, when the liquid is passing in drops, is nearly in proportion to the amount of pressure exerted *upon the filtering medium*. But I do not think the rate of flow increases in an amount parallel with that particular portion of the total pressure which produces the flow *through* the medium. I believe it increases in an extent proportionate to the square root of that particular amount of the hydrostatic power which is exerted only in producing the filtering effect. I shall, however, refer again to this matter presently. Let us for the present consider the nature of the action when the filtering-liquid passes in a fair stream, as it nearly always does in a practical filter. The amount of filtered liquid then obtained approaches more nearly to an amount which is in proportion to the square root of the length of the column of liquid in the instrument,—a given amount being obtained from a one-foot column, that amount is only doubled when the length of the column approaches four feet. With a four-feet column only rather more than twice as much filtered liquid is obtained instead of nearly four times, as was the case when the liquid passed through in drops. And this result might be expected. For, according to the discoveries of Torricelli, liquids escaping from apertures in the bottom of any vessel obey the ordinary laws of gravitation, and flow at a rate directly parallel with the square root of the distance from the aperture to the level of the liquid. At an aperture four feet below the surface of water in a vessel, the velocity of the outflowing liquid will be twice as fast as when the surface is only one foot above the aperture, three times as fast at a depth of nine feet, four times at sixteen feet, and so on. If now such an aperture be covered by a piece of netting, the rate of outflow will still be much the same as before, because the netting presents very little resistance. If the netting be replaced by one thickness of coarse flannel, the rate of motion will still, according to my experiments, be nearly parallel with the squares of the distances from the orifice to the surface of the water. With black cloth about two and a half times as much was obtained from the vessel I used, when the column of liquid was four feet long, as when it was one foot long, and so on; until, on closing the aperture with tightly-packed sponge, nearly four times as much was obtained from a four-feet as from a one-foot column. The final experiment could only be to so block up the aperture as that the pressure on the plug, now no longer a filtering medium, should be exactly four times as great with a four-feet column as with a one-foot column of liquid. These experiments and considerations show that any filter in which gravitation is aided by the use of a long column of liquid above the filtering medium must be considered to be a hydrodynamic filter, rather than a hydrostatic one,—a filter whose useful action depends chiefly on the ordinary law of liquids in motion; a filter whose useful effect is in direct proportion to the extent to which the hydrodynamic law of acceleration of motion manifests itself, and in inverse proportion to the extent to which the hydrostatic law relating to the amount of pressure at the base of a still column of liquid manifests itself.

The filtering arrangement which has commonly, but wrongly, been termed "the hydrostatic filter" has probably become to be so called because similar in form to the vessels used by lecturers, or figured in books, to demonstrate the truth of the hydrostatic laws previously referred to. A common barrel standing on one of its heads, and having a long vertical tube screwed tightly into its other head, is one form of such vessels. It is well known that such a barrel, full of liquid, may be burst by simply pouring into the vertical tube a few pounds, or even, if the tube is very narrow, a few ounces of water. The reason of this is obvious. If the area of the tube is, say, the fiftieth of an inch, then the weight of the few ounces of water in the tube is exerted on every fiftieth of an inch inside the barrel, making a total pressure of many thousands of pounds, which of course the barrel cannot bear.* To adapt this hydrostatic multiplication of

* It will not be out of place to here remind the pharmaceutist, that the thickness of the vertical column of liquid has nothing to do with the effect produced: a column of a given height and an inch in area, will produce its effect on every inch of surface, a column of the same height and only half an inch in area, will, of course, only weigh half as much,

the pressure exerted by a few ounces of liquid to the operation of filtration must have occurred to many minds. Replace the bottom of the barrel just mentioned by a filtering medium, tie a piece of filter-cloth, etc., over the open bottom of such a barrel, and there is what would most naturally be termed a hydrostatic filter at once. Such an arrangement was proposed for the filtration of oil, about the year 1828, by Mr. J. Robison, at the Society of Arts (Trans. Soc. Arts, xlvii.–xlviii. p. 162). Mr. Robison drew, or rather forced, off the oil through a filter (placed in the upper part of the barrel, thus supplementing the advantages of repose and subsidence) by a column of water in a tube reaching to the bottom of the barrel, and of "a height sufficient to give the requisite hydrostatic pressure."* And a pressure approaching to hydrostatic pressure Mr. Robison certainly had in the upper part of the barrel, when his oil filtered through the medium in drops or in a very thin stream; and he would doubtless nearly double the rate of flow on doubling the height of the column of water, and so on, as already explained. But if the oil flowed in a fairly full stream from the filter when the column of water was at a height of, say, a foot above the orifice of outflow, then the amount of oil obtained in a given time would not be doubled until the column approached four feet in length; the effect would now be, even apparently, mainly due to hydrodynamic laws, the amount obtained be more directly in proportion to the square root of the length of the column instead of to the simple length. Such a filter is, therefore, obviously more correctly termed a hydrodynamic filter. To speak of it as hydrostatic conveys a wrong impression of its action, and induces in the mind an erroneous estimate of its powers. Probably this kind of filter will now always retain the name of "hydrostatic;" but the fact should be borne in mind that the legitimate claims it has to the name rest in the form of the instrument, and in the way the hydrodynamic effect of the column is conveyed to every portion, of similar area, of the filtering medium, rather than in the effect produced.

Twelve years before Mr. Robison published an account of the oil-filter just decsribed, Count Réal proposed an apparatus termed a "filter press," the figure of which in vol. ii. of the 'Journal de Pharmacie,' p. 192 (1816), forçibly reminded me of the barrel and long vertical tube I have already alluded to. It was simply a tin box, over the open bottom of which the filtering medium was stretched, and into the lid of which a long tube was firmly fastened. Count Réal considered that such materials as tea, coffee, cinchona bark, and the ingredients for tinctures and extracts generally, would be exhausted of their soluble principles more effectually if exposed in his apparatus to the pressure produced by the hydrostatic multiplication of the weight of the exhausting fluid in the

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and hence give only half the pressure, but then that pressure is exerted on every half-inch of surface, and so the effect on every inch will be the same as before. It is the height, not the thickness, of the column that effects the result. Whatever the pressure is at a given length of column, it is doubled at twice the length, tripled at thrice the length, quadrupled at four times the length, and so on in proportions exactly parallel with the simple distance.

* This was filtration *per ascensum*, and is in use to the present day. With regard, however, to the name given to this method of filtration, it is important to observe, that the *ascent* of the filtering-liquid is still produced by gravitation, produced by the *descent* of the liquid in the long column. The name is good enough for indicating the act performed, but should be *per descensum*, if the nature of that action were desired to be indicated. The modification of this filter devised by Mr. W. R. Warner, of Philadelphia (see Parrish's 'Practical Pharmacy,' 3rd edit. p. 161), is stated to afford a barrel of oil daily. The cause of the advantage of these filters, through which liquids pass from below upwards, is, that solid matters settle away from, rather than on, the medium, and hence the hydrodynamic action of the machine is maintained. When the current is in the opposite direction, the medium chokes, hydrodynamic action becomes more and more feeble, the liquid passes in drops slowly and more slowly, succeeding each other, hydrostatic action has now nearly full possession of the field, and the instrument is, to a corresponding extent, useless.

long tube of his instrument, than by mere maceration in the fluid in the usual way. And the Count certainly did get better results than had been obtained by the old plan. But, as MM. Boullay afterwards showed,* the improved results depended on the continuous displacement of the saturated infusion or tincture in contact with the materials by the upper layers of the menstruum, and were quite independent of pressure. The use of the long pressure-tube was consequently discontinued, and the resulting vessel was the "Boullay Filter" or percolator.

But, even the Réal filter-press of 1816 was not the first in which the pressure of a hydrostatic column was attempted to be used as an aid to filtration. M. Cadet, in an article descriptive of Réal's instrument in the 'Journal de Pharmacie' of April of that year, says, "The English have applied this principle to the purification of oils. By means of an apparatus called a *hydraulic lever*, and which is formed of a brass box surmounted by a long tube, they force the oil to traverse a thick bed of charcoal, which serves to filter and purify it." Mr. Robison, in 1828, was doubtless unaware of this practice of his countrymen, which M. Cadet evidently knew of before 1816.

The influence of a column of water *below* the filtering medium has recently been proposed by Mr. Schacht.† The nature of the action in such an arrangement, is somewhat different to that in which the column is above the filter. It is still mainly a hydrodynamic action, but the flow is also partly set up by atmospheric pressure; but, to prove this assertion, it will be necessary, as before, to trace the effect from its sources. Suppose, then, a long glass tube is securely closed at its lower extremity by a flat glass plate, and the tube filled to the brim with water. The pressure of water on the plate will then depend on the length of the column as already explained, and may be increased up to 50, 60, or a 100 feet, or until no vessel could be found strong enough to resist the force. Moreover, the pressure will depend *only* on the column of water,—it will be independent of the air, it will be hydrostatic, not aerostatic. But, suppose the tube to be turned upside down, the liquid being prevented from escaping by the open end being plunged beneath the surface of water in a basin, tub, etc., or by the open end of the tube being curved round after the manner of barometer tubes. The influence of the column of water on the inner surface of the plate will now be in exactly the opposite degree to what it was before. When the tube was upright, an increase in the length of the column produced an increase in the pressure on the inner surface of the plate at the bottom. Now it is reversed: an increase in the length of the column produces a decrease in the amount of pressure on the inner surface of the plate. Before the increase of pressure was continued up to any number of feet, now the decrease ceases at about thirty-four feet, when the water leaves the inner surface altogether, and, therefore, at that distance ceases to exert any pressure at all. The cause of this difference of effect in the two cases is plain. When the tube is open end upwards, the gravitation of the water is opposed by the rigid sides and bottom of the vessel; when it is reversed, the gravitation is opposed by the atmosphere on the liquid at the open end of the tube. If, when the open end is downwards, there be no water in the tube, this atmospheric pressure on the inner surface of the plate is about fifteen pounds on every square inch; if there be thirty-four feet of water in the tube, the pressure is nothing; if the column of water is one foot long, the pressure on the inner surface of the plate is one thirty-fourth of fifteen pounds less than fifteen pounds; if four feet long, four thirty-fourths; if seventeen feet long, seventeen thirty-fourths of fifteen pounds less than fifteen pounds; or half

* 1833, 'Journal de Pharmacie,' tome xix. p. 281.

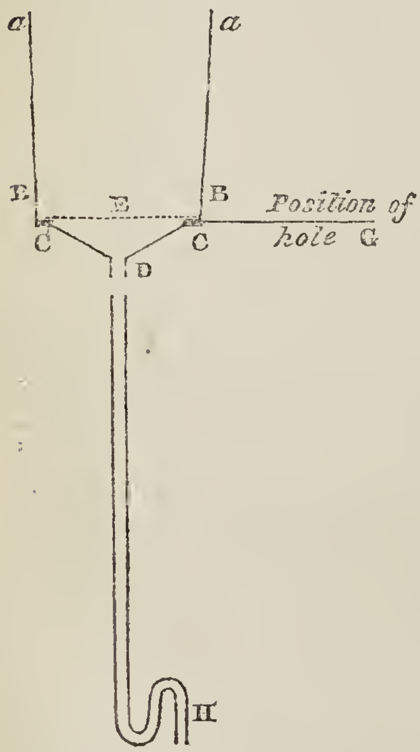
† Mr. Schacht's paper was read at the meeting of the British Pharmaceutical Conference at Birmingham in September, 1865, and published in the 'Pharmaceutical Journal' of the following month.

as much as at first, and so on. While, therefore, any pressure which a column of water exerts on the bottom of a tube when the open end of the tube is upright, is a pressure correctly termed hydrostatic, which, in fact, can only be termed hydrostatic,—the pressure exerted at the same point when the tube is reversed, can only be properly estimated and appreciated under the term aerostatic, for it is a pressure whose origin is the natural pressure of the atmosphere on all things at the surface of our earth; that pressure, it is true, is *conveyed* by the water, but the water exerts no pressure itself; indeed, on the contrary, the presence of the water so reduces the amount of aerostatic pressure as to very soon (when the column is thirty-four feet long) obliterate it altogether.

All that has just been stated concerning a simple tube closed at one end, is, of course, applicable in the case of the closed end being so enlarged out as to more nearly resemble a barrel, into one head of which a long tube is fixed. As before stated, such an instrument is, when filled with liquid and the tube pointing upwards, a pure hydrostatic arrangement. But when the whole is reversed and the tube points downwards, it is no longer a hydrostatic apparatus; for so far from an increase in the length of the column causing an increase in the pressure inside the barrel until the barrel bursts, it positively causes a decrease in the pressure, and the pressure ceases altogether when the column is thirty-four feet long, as in the case of the simple tube.

In short, such apparatus as the inverted barrel and tube just described, or the inverted simple tube mentioned in the previous paragraph, though identical in construction with hydrostatic arrangements, are purely aerostatic apparatus, and their chief use is to illustrate aerostatic laws.*

Mr. Schacht's filter is just a vessel as I have been describing in the previous two or three paragraphs, only that the upper head of the barrel is replaced by a filtering medium, which can be securely fixed to the inner sides of the barrel, and so as to leave some space in which to retain the filtering mixture above the medium. (Its material and mounting is also, of course, more useful and elegant than this description would indicate. See the accompanying figure.) If then the filter that I have previously alluded to as the so-called "hydrostatic filter" is wrongly so termed, clearly the filter that I have just described as Schacht's filter is not a hydrostatic filter, even though it closely resemble in construction the apparatus used in the demonstration of hydrostatic laws. The most that could be claimed for it is that it is an aerostatic filter,—the increased length of the column of liquid below the filtering medium admitting of the increased manifestation of atmospheric pressure on the surface of the filtering mixture; but it is not even an aerostatic filter, at least not purely or even mainly so. If it were, the velocity of filtration would increase with the simple length of the tube, instead of at a rate proportionate to the square root of that length; whereas the rate in practical



* Thus when either is empty, the atmospheric pressure on both sides of the bottom of the barrel, or on the inside and outside of the glass plate forming the bottom of the tube, is fifteen pounds per square inch. When either is filled with water to the length of a dozen yards, and then inverted, so that the open end of the tube dips into a basin or tub of water, the pressure on the inside of the glass plate, or on the inside of the upper head of the tube, is reduced to nothing; the water, in fact, leaves those surfaces altogether, and sinks to a

filters is always nearer to the latter than the former rate, as I shall now show.

To ascertain the velocity of filtration of water through different kinds of filtering media, each medium being placed under the influence of columns of water of various lengths beneath it, a Schacht's filter was made in the following manner:—into a glass vessel of about the size and shape of a common tumbler, but having a hole in its base,—into a vessel resembling, in short, a flower-pot,—a disk or disks of flannel was securely fixed by a cork having many perforations at about half an inch from the bottom; a few inches of narrow glass-tube was now fitted by a cork into the hole of the vessel, and a ten-feet length of three-sixteenth india-rubber tubing attached to the glass tube. By immersing the vessel, mouth downwards in a pan of water, and sucking air out of the distal extremity of the flexible tube, the whole apparatus was filled with water in a more efficient though certainly more troublesome manner than that proposed by Mr. Schacht. I shall describe a still better method presently. The glass was now elevated, mouth upwards of course, to a height of about ten feet from the floor and, the level of the water in it being kept constant by a proper supply, water allowed to flow off by the india-rubber tube, at different distances from the surface of the liquid, the tube being, for this purpose, simply held in the shape of the letter U, and its orifice raised or lowered so as to be one, two, three, four, five, six, seven, eight, or nine feet from the level of the water in the filtering vessel. The time of flow was at each distance exactly sixty seconds, and the following were the amounts obtained:—

	Through flannel.	Through close black coat-cloth.
At 1 foot	9 ounces	7 ounces.
2 feet	15 ,,	11½ ,,
3 ,,	20½ ,,	15½ ,,
4 ,,	24½ ,,	19½ ,,
5 ,,	27½ ,,	23 ,,
6 ,,	30½ ,,	25½ ,,
7 ,,	32½ ,,	27½ ,,
8 ,,	35½ ,,	30 ,,
9 ,,	37½ ,,	32 ,,

A glance at this table is sufficient to show that in these experiments the rate of flow is far more nearly what it would be if due only to the acceleration of motion in gravitating bodies, obtained with liquids, by the use of a long column, than if it were simply due to the excess of atmospheric pressure above, over that below the filtering medium. The following table shows the quantities that would be obtained if the flow were hydrodynamic, if it increased in an aerostatic proportion and the quantities actually yielded in the case of the flannel filter, the actual rate at one foot being the *assumed* unit for hydrodynamic and aerostatic rates of increase:—

	Hydrodynamic rate.	Aerostatic proportion.	Actual rate.
At 1 foot	9 ounces	9 ounces	9 ounces.
2 feet	12¾ ,,	18 ,,	15 ,,
3 ,,	15½ ,,	27 ,,	30½ ,,

height of about thirty-four feet. But the pressure on the outside of the plate or the tub is still fifteen pounds on the square inch; and thus is demonstrated the fact, that the only influence of a column of water on the closed and upper end of a long tube or other vessel, is to so oppose aerostatic pressure, exerted within the vessel, as to enable the aerostatic pressure outside the vessel to manifest itself. Roughly speaking, every foot of such a column developes half a pound of aerostatic pressure on the outside of a vessel.

	Hydrodynamic rate.	Aerostatic proportion.	Actual rate.
4 ,,	. . . 18 ,,	. . . 36 ,,	. . . $24\frac{1}{2}$,,
5 ,,	. . . 20 ,,	. . . 45 ,,	. . . $27\frac{1}{2}$,,
6 ,,	. . . 22 ,,	. . . 54 ,,	. . . $30\frac{1}{2}$,,
7 ,,	. . . $23\frac{3}{4}$,,	. . . 63 ,,	. . . $32\frac{1}{2}$,,
8 ,,	. . . $25\frac{1}{2}$,,	. . . 72 ,,	. . . $35\frac{1}{2}$,,
9 ,,	. . . 27 ,,	. . . 81 ,,	. . . $37\frac{1}{2}$,,

Mr. Schacht's own instrument, fitted with a medium composed of two thicknesses of unbleached and unglazed calico, gave to that gentleman and myself the following rate of flow with pure water in one minute :—

	Actual rate.	Hydrodynamic rate.	Aerostatic proportion.
At 1 foot . . .	34 ounces . . .	. 34 ounces . . .	. 34 ounces
2 feet . . .	57 ,, . . .	. 48 ,, . . .	. 68 ,,
3 ,, . . .	73 ,, . . .	. 59 ,, . . .	. 102 ,,
4 ,, . . .	87 ,, . . .	. 68 ,, . . .	. 136 ,,

The extent to which the actual rates come nearer to the hydrodynamic rates than to the aerostatic proportions, is just the apparent extent to which the actual filtration through the particular media used in the experiments, is a hydrodynamic operation rather than due to aerostatic pressure. This is even still more evident if a number other than the first be taken as the unit. Thus the actual flow through the flannel in one minute being fifteen ounces when the orifice of outflow is two feet below the level of the liquid in the filtering-glass, it should be, at eight feet, sixty ounces if the action were aerostatic, and thirty if hydrodynamic : as it actually is thirty-seven and a half, it is obvious, if these numbers were rigidly correct, that 80 per cent. of the aid which gravitation obtains by the use of an eight-feet column of liquid below a certain flannel filter, is hydrodynamic aid, and 20 per cent. aerostatic. Similar remarks might be made concerning the cloth filtering medium. On looking at the rate at which water flows through it, we see that whatever be the amount which passes by mere gravitation, as when the cloth is folded into a cone and inserted in a common funnel, that amount is greatly increased by the use of a long column of the water below the cloth. The proportion of this aid to gravitation which is apparently due to hydrodynamic action is somewhat less, and aerostatic action somewhat more than in the case of the flannel, but still mostly hydrodynamic.

Here let me correct an error which some are likely to fall into. The table just given would at first sight seem to indicate that if the hydrodynamic action of the filter were destroyed by admitting air into the chamber below the filtering medium, the possibly pure aerostatic action of the resulting column would be superior to the normal action, to the extent that an aerostatic rate of pressure is superior to a hydrodynamic rate. As a matter of fact, however, such a filter obtained by using a long column of water below, but not continuous with the medium, gives smaller instead of greater amounts of filtered liquid in a given time. The reason of this is obvious; the filtered liquid has now a plug of air to circumvent before it can flow away. The maximum amount of filtration can clearly only be obtained when there is no plug of air or any other stationary plug; when, in fact, the column of water is perfectly continuous with the filtering medium. The latter condition attained, the maximum amount of aerostatic effect is then supplemented by a maximum of hydrodynamic action. I say by a maximum, because there is doubtless some hydrodynamic action even when the chamber or glass tube beneath the filtering medium contains air, the water flowing down round the sides of the air-plug in an attenuated but not broken column. Again, the actual rate being greater than the hydrodynamic rate would seem to indicate that hydrodynamic force is supplemented by some other force. Not so. The fact is, that the hydrodynamic rate given is less hydrodynamic than it should be, owing to the resistance of the medium, a resistance that is more evident with short columns than with long.

To continue these experiments with other filtering media would be of little additional interest or value. No two different filtering media offer equal resistance, nor do any two pieces of the same medium give exactly equal results; indeed, any given piece of a medium alters to some extent in porosity even during the performance of a few experiments: add to this the fact that in filtration as practised by analysts and pharmaceutists the medium is constantly receiving accessions of deposited matter until it chokes and ceases to be a filter any longer, and it will be evident that such experiments would be of no practical value for reference, and would only tell us what those I have described teach us already.

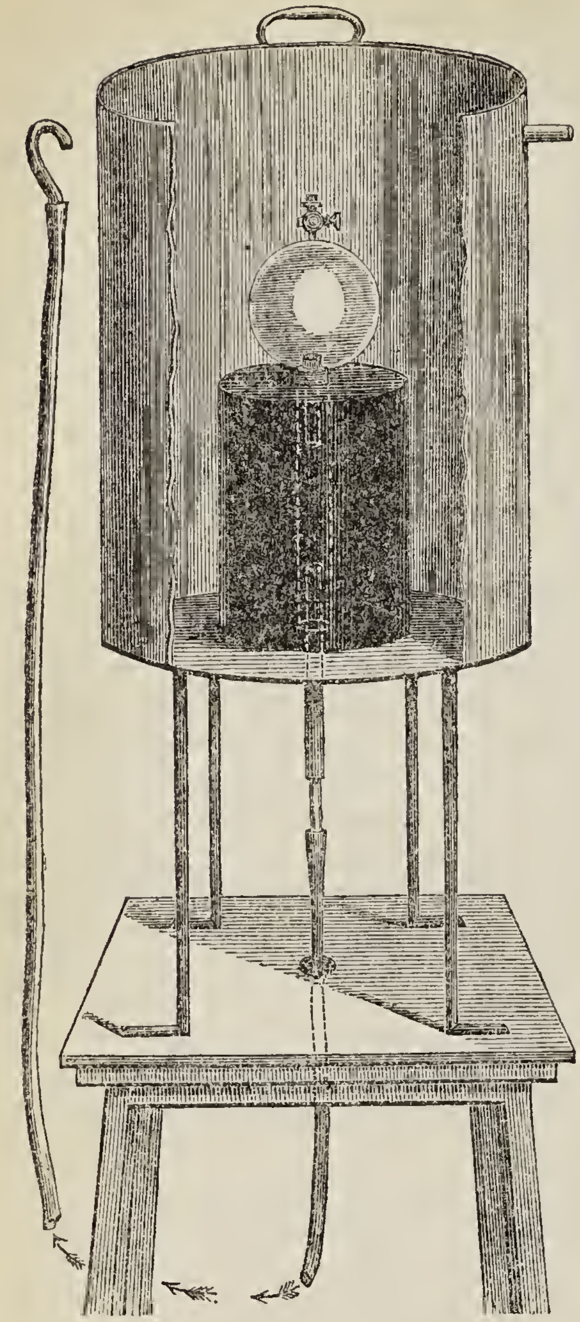
By way of connecting the experiments on flannel and cloth with the next series in which columns of liquid of increasing length up to forty-two feet were used, I may state that the rate of flow through a medium made of a particular kind of coke was taken. The coke was that known as the moulded carbon filter of Messrs. Atkin's and Son, of Fleet Street. I believe it is manufactured by igniting, under pressure, a mixture of charcoal or coke and pitch. This material I found to be more constant in its operation during a series of experiments than those already alluded to. The form known as the "siphon filter" was first used. It is simply a block or disk of the carbon, in which a hole is bored from any point in the circumference to the centre, and into which hole a short glass tube is inserted. An india-rubber tube of any convenient length is fixed on the glass tube, and now, on aspirating, filtered water can be drawn into the mouth from any source, or a tumbler filled by arranging the tube as a siphon, that is, by lowering the block to the bottom of a jug of water and letting the tube hang over the spout of the jug and dip into a tumbler placed below the level of the jug. In the experiments the level of the water was of course kept constant. The orifice of outflow being raised or lowered, the following was the rate of flow in two minutes at different distances from the surface of the water:—The rate through the tube without the carbon is also given for comparison, and to show that the whole resistance to the flow must not be ascribed to the carbon.

	With carbon.	Without carbon.
At 4 inches . . .	3 ounces . . .	9 ounces.
8 ,, . . .	5 ,, . . .	16 ,,
12 ,, . . .	$6\frac{3}{4}$,, . . .	22 ,,
16 ,, . . .	$8\frac{1}{2}$,, . . .	27 ,,

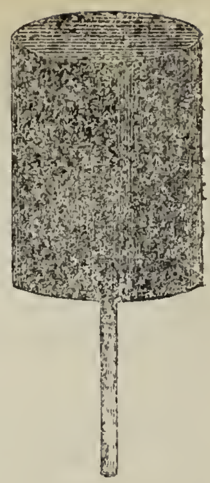
Here, again, it is evident that the flow is chiefly hydrodynamic.

In order to ascertain the extent to which the rate of flow is increased, when the column of liquid beneath the filtering medium is prolonged to great distances (30 to 40 feet), some special precautions were necessary. To ensure constancy of action and strength of material, as well as to obtain the greatest practical proportion of aerostatic pressure, a carbon block was chosen of closer texture and larger size.

The flow from the block itself, without any column, was not a continuous current, but simply a succession of drops. The block fairly represented, therefore, the state of a practical (tincture, etc.) filter in a clogged condition, a point at which an operator becomes anxious, for economical reasons, to increase the flow. The nature of the action of such a clogged filter cannot be ascertained by direct experiment upon it, because the medium would be getting thicker and denser during even one series of experiments. But the nature of the action of a carbon block filter, which is giving the same amount of resistance to the passage of liquid that the clogged filter gives, must fairly represent the nature of the action of the clogged filter itself. It was a cylinder, six inches long and the same in diameter (see the accompanying figure), and hence afforded a filtering surface of more than 150 square inches. The flow



from this, with a one-foot column in five minutes, was $18\frac{1}{2}$ ounces, equal to 0·247 of an ounce, or about ten drops (grains) per square inch per minute. (The flow through the flannel previously mentioned was nearly one hundred times faster per square inch per minute.) The glass tube of the block was now passed through, and secured to, a hole or short pipe in the bottom of a small cistern, after the manner shown in the larger woodcut. Forty-four feet of three-eighth composition metal gas-piping was now added to the glass-tube. The cistern being kept full of water, the metal tube was gradually lowered down the well of a staircase, forming a curve like the letter U, and thus filled with the water to the exclusion of every trace of air. This was done, because in some previous trial experiments the presence of air in the small central cavity of the block was found to interfere with the hydrodynamic action, and to nearly reduce the rate of flow to what was set up by aerostatic pressure. Indeed, it may be well to state at once, that in order to remove this source of error altogether, even at lengths of the column at which the pressure on the interior of the filter was so reduced that several cubic inches of air came out of solution in the water at every experiment, the hole in the block was continued quite through to the upper surface, a glass tube inserted into the upper orifice, and a glass flask filled with water fitted on to the tube by a cork. Any air now disengaged in the interior of a block rose up into the inverted flask, and thus the continued integrity of the column was secured (see the accompanying woodcut). On now lowering the open extremity of the long metal U tube, the following were the amounts of water obtained at different distances during a period of five minutes in every case. The hydrodynamic rate of flow and the rate of increase of aerostatic pressure are given for comparison.



	Hydrodynamic rate.	Actual rate.	Aerostatic proportions.
At 3 feet	41 ounces	41 ounces	41 ounces.
6 ,,	58 ,,	67 ,,	82 ,,
9 ,,	71 ,,	93 ,,	123 ,,
12 ,,	82 ,,	130 ,,	164 ,,
15 ,,	91 ,,	164 ,,	205 ,,
18 ,,	100 ,,	198 ,,	246 ,,
24 ,,	116 ,,	230 ,,	328 ,,
30 ,,	130 ,,	270 ,,	410 ,,
36 ,,	142 ,,	288 ,,	438 ,,
42 ,,	154 ,,	301 ,,	438 ,,

Thinking that the friction of the water in such a length of tubing might influence the numbers, I performed nine experiments with a ten-feet length of tubing, with the following results:—

At 1 foot	. . . . .	$18\frac{1}{2}$ ounces.
2 feet	. . . . .	31 ,,
3 ,,	. . . . .	40 ,,
4 ,,	. . . . .	49 ,,
5 ,,	. . . . .	57 ,,
6 ,,	. . . . .	66 ,,
7 ,,	. . . . .	77 ,,
8 ,,	. . . . .	87 ,,
9 ,,	. . . . .	94 ,,

Flow = five minutes in each experiment.

The results at three, six, and nine feet are sufficiently near to those in the previous series of experiments to indicate that the amount of the U-shaped portion of the apparatus does not materially influence matters.

From these last two series of experiments it is again obvious that the nature of the action of such a filter, even though it present an unusually large amount of resistance to the passage of liquids, is still, even apparently, partly hydrodynamic. (I believe that actually it is wholly hydrodynamic for reasons I shall give presently.)

I was not altogether prepared to find that the rate of flow continued to increase beyond thirty-four feet; indeed, I was somewhat surprised that the rate should increase, as it does, after about twenty-five feet. For the air which comes out of solution in the water at these diminished pressures expands of course considerably at the moment of evolution, and destroys (apparently) the continuity of the long column with the filtering medium. It does this as the length of the column approaches thirty feet, even though the capacity of the air-chamber above the medium be nearly one pint. And I had supposed that, with the destruction of the continuity of the column, hydrodynamic increase of rate would cease. On watching the flow, however, in the glass tube a few inches below the medium during the use of the forty-two-feet column, I became convinced that, although the column did not at that point occupy the whole area of the tube, yet its continuity was not sufficiently impaired to totally interfere with the advantages resulting from the use of that length of column below the filter. In short, the column was *not* broken, the rapidity of flow at this great length being sufficient to enable it to maintain its integrity. If this explanation of the increase in the rate of flow beyond aerostatic-pressure distances be the correct one, that increased rate is a fresh means of proof of the part played by hydrodynamic action in the instrument.

With regard to filtration in which gravitation is aided by hydrodynamic pressure, I would say, finally, we must regard the action of instruments for this purpose as, normally, identical with that of the water supply of those houses in which there is a cistern in the roof and a descending supply-pipe. The rate of flow from such a pipe is, we all know, in proportion with the square root of the distance from the orifice of outflow to the surface of the water in the cistern. Place now a filtering medium in the upper part of the whole column of water (say near the bottom of the cistern), and you have a "Schacht's filter." Diminish the porosity of the medium, and you interfere with the normal rate of flow, until the medium is impervious. The pressure on the upper surface of the medium is now wholly static; to a small extent hydrostatic, but chiefly aerostatic. Remove this medium and place it at the bottom of the column of water, and you have the so-called, but wrongly-termed "hydrostatic filter." Diminish the porosity of the medium, cripple it as a filter, and you interfere with the normal rate of flow until the medium is impervious. And now the pressure on the upper surface of the medium really is wholly hydrostatic, but the instrument is no longer a filter.

Conclusion.

We (hearers, readers, and myself) have now studied one small paragraph of one of the great chapters of nature's great book. And, like true students of nature, we have studied her for her own sake. Yet all natural facts must have their application; and so we will not be content with the pleasure we may have obtained from our work, but will endeavour to deduce some useful lessons from it.

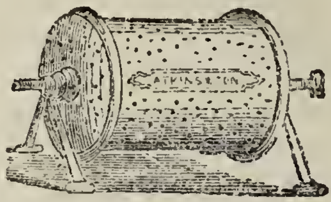
The practical applications of the truths we have been considering, are for the most part obvious, and already well known to all. But of what new value are they? as follows:—

Firstly, these observations and experiments give us, I think, clearer, more correct views of the nature of the operation of filtration, than most of us had before. We should, I think, regard filtration under any and all circumstances from a hydrodynamic point of view. We should regard it as the flow of a liquid from an orifice in the vessel containing the liquid, the flow being interfered with or resisted, to a greater or less degree, by a porous fabric, termed a filtering medium. The rate of flow we should regard as normally following that decribed in the theorem of Torricelli, namely, in proportion to the square root of the distance from the orifice of outflow to the surface of the filtering-liquid; or, as the law may perhaps be stated for our purpose, "the rate of flow is proportionate to the square root of the power," whether that power be derived from gravitation, muscular or mechanical force, or the elasticity of compressed air or steam. As the flow becomes slower and slower, the manifestation of this dynamic law becomes less and less evident, and the existence of a static law, in the instrument, more and more evident, until, when the flow ceases altogether, a static pressure only exists within the apparatus: hydrostatic in the common conical and other simple filters, the filter-bag pressed in the various ways, and the filter in which there is a column of liquid above the medium; aerostatic where the air is removed from below a medium or additional air, etc., forced on the filtering mixture from above, or where there is a column of liquid maintained below the medium. As a filtering medium always presents some resistance, dynamic laws can never apparently exclusively obtain in a filtering apparatus, though they nearly do so in the filtration of water on the large scale. So also, as that resistance can never be complete, filtration can never be a static operation, nor can static laws exclusively obtain in a filtering apparatus, until the latter ceases to be a filter, though they nearly do so when the filtered liquid is escaping drop by drop, as may generally be seen in an analyst's filter. Though, however, a filtering apparatus can never be the exclusive seat of either dynamic or of static laws, it is quite possible that *the flow* from the apparatus is governed purely by dynamic laws. The rate of flow does not *appear* to be a pure dynamic rate, probably because we can only compare it with the total amount of force applied. But a portion of that force is expended in producing static pressure within the instrument; the residue, if we could estimate it, would probably show that the flow from the filter is actually, though not apparently, a flow proportionate to the square root of the amount of force which produces it. For instance, a filter is giving a certain number of drops per minute, under a certain amount of force; double the amount of force, and we get nearly double the number of drops: in the first case, nearly all the force applied is expended in producing static pressure within the instrument, the residue being expended in producing the flow; in the second case, also, nearly all the force is expended in producing static pressure within the instrument, but not quite twice as much as in the first case; thus, probably, the residue of power is four times greater than in the first case, and hence we get a double flow. And so on, until, with a free orifice, there is no static pressure at all within the instrument, when we get a rate of flow which is apparently as well as actually dynamic. It is for these considerations chiefly that I think we should regard filtration in a dynamic aspect. A less strong, though more obvious reason, is that useful filtration—that is, rapidity of flow—is in proportion to the extent to which apparently as well as actually dynamic laws obtain in filters.

Secondly, we have been told that pressure-filters have not hitherto proved of the service in Pharmacy that was expected of them; that where they are most needed, namely, for the separation of solid matter in a very minute state of division or in a flocculent condition, there they fail, and that a turbid instead of a clear and bright filtered liquid results. Now, so long as we consider pressure-filters to be static instruments, this result must be inexplicable. But once realize their dynamic character, and the explanation of the fact would seem to be this:—a flock or particle of solid matter finds itself at the mouth of a pore of a filter; if that particle were the object of static laws only (aerostatic or hydrostatic), there it would remain, resting, so to speak, on the edges of the pore; and there it would remain, we will suppose, if the pore were the pore of a common filter in a common funnel, the pressure that is above the particle being in this case only slightly greater than that below the particle; but now greatly increase the pressure on that particle from above, either directly by adding pressure, or indirectly by taking pressure from below, then the particle is at once shot through the pore, it being compressed if it be a flock, or it itself enlarging the fibrous interior of the pore, if the particle being incompressible, and if the pore be in paper, cotton, wool, etc. In other words, the force which increases the gravitating motion of fluid particles through the pores of a filtering medium, increases the gravitating tendency of any solid particles which may be resting within or on the edges of those pores. This explanation (and the being able to give explanations of facts is a matter of practical value) follows, I think, from the consideration of our subject. In Mr. Schacht's pressure-filter, this stated objection to the old pressure-filters may possibly not obtain, because the pressure can be increased so gradually that the consolidation of the particles of solid matter, which are constantly increasing the resistance of the filtering medium, goes on *pari passu* with the pressure itself; in other words, the closeness of the filtering medium in his instrument increases regularly with the pressure instead of spasmodically as in other older instruments. Whether this be so or not, can only be determined by experience in the use of his filter.

Thirdly, apply hand-pressure, lever- or screw-pressure, and hydraulic pressure, directly to as small a portion of the surface of a filter-bag as possible. The flow from a pressed bag, containing a mixture to be filtered, is *less* when the hands of two persons press it, than when only one is so engaged, if the second man places his hands on any exposed part of the bag; and so on, until the whole of the exterior surface of the bag is covered by pressing hands, when the flow will cease altogether. Let a second operator place his hands on the hands of the first, and so on, and then the additional power will be exerted to the most useful extent. So with a "lemon-squeezer" or "tincture-press," etc., let as much of the pressed bag be exposed as possible. In a word, let the pressure which, exerted on a given area outside, is conveyed to every similar area inside the bag be opposed as little as possible by pressure on the corresponding areas of the exterior. Of course, the pipe and orifice or other means of outflow of any filtering-liquid must be capable of conveying away a larger quantity of liquid than is ever likely to pass through it.

Fourthly, if, in filtration, pharmaceutists, engineers, and others desire to have the full benefit which the use of a long column of liquid below their filter gives them, that column must be perfectly continuous,—there must be no break in it caused by the introduction of air from without the instrument, or by the accumulation of air coming out of solution in the water, as we all know it will do when atmospheric pressure is removed. The practical means, I would propose, of getting rid of such accumulations, I have already described, namely, in the introduction of a small glass reservoir between the upper surface of the filtering medium and the surface of the water in the vessel in which the medium is placed. A small stopcock in the top of such reservoir would allow of the expulsion of any accumulated air on merely closing the orifices of outflow. For example, the carbon block and casing shown in the accompanying woodcut of the "cistern filter" of Messrs. Atkins might have such a reservoir placed above the centre of the block, communicating by a glass tube and cork with the central cavity of the block. Whether or not an increased flow from such a filter is desirable, and would be more than equivalent to the extra complexity and cost of the instrument, I will not now determine; nor can I state how far such a flow through the carbon block might in time impair its porosity. I merely throw out the hint.



Fifthly, since writing this paper, and only a few hours before its delivery, Mr. Schacht has told me that his original idea in devising the form of filter he described at Birmingham, was simply the production of an aerostatic instrument, the hole in the upper part of the chamber beneath the filtering medium being placed there to admit of the long tube being conveniently filled, and not to ensure the removal of every trace of air from that chamber. On examining the filter he brought to me, I at once saw that all the air was not removed, that sufficient remained to interfere with though not to destroy the continuity of the column. I would, therefore, more distinctly than in the last paragraph, propose an improvement in his filter. I would suggest the blocking up of the small side-hole in his instrument altogether, and the adoption of a narrow channel of communication from below to above the medium, terminating in a glass flask and stopcock as already described. The plane of the perforated metal plate on which the medium rests, might be slightly inclined, and the small channel be then at the side rather than in the centre of the medium.

I am indebted to Mr. Watts for the trouble he has taken in assisting me in the performance of the foregoing experiments.

The CHAIRMAN said, as the usual hour for adjournment was already passed, it would be hardly be possible, on that evening, to enter upon the discussion of the paper that had just been read. He observed, however, that Mr. Schacht, whose apparatus had been referred to, was present, and the meeting would no doubt be glad to hear his explanation of his filter, unless he could make it convenient to attend on another occasion.

Mr. SCHACHT said he did not think he should be able to attend the next meeting, and, as it seemed to be the wish of the meeting that he should say something about his own apparatus, he would endeavour, in a few words, to explain its origin, and to point out the advantages he ascribed to it. Having occasion to devise some means for promoting the filtration of oils and substances, which in the ordinary way pass through a filter with difficulty, he endeavoured to render the pressure of the atmosphere available by introducing a column of liquid beneath the filter and in contact with it, the effect of which was to remove a part of the upward pressure of the atmosphere against the bed of the filter, and thus to give a preponderance to the downward pressure. This preponderance, or differential pressure as he had called it, depended upon the length of the column of liquid beneath the filter. The arrangement was a simple one, and he found it to be efficient. The principle upon which its efficacy depended was, he thought, sufficiently obvious, and he did not think Dr. Attfield had represented its action very correctly. In practical operations in filtration, where the assistance of atmospheric or other pressure was required, the filter-bed was something very different from the flannel or cloth used in Dr. Attfield's experiments.

Dr. Redwood thought with Mr. Schacht, that the experiments which had been described were not entirely satisfactory, and that the subject, although it had been somewhat elaborately treated, was not by any means exhausted. He differed from the author on some points, with reference to which there appeared to be some confusion and unnecessary attempt at refinement.

MEETING OF CHEMISTS AT NOTTINGHAM.

A special meeting of the chemists of Nottingham was held at the Maypole Hotel, on Friday evening, the 24th of November, to consider—

1st, The proposed visit of the Pharmaceutical Conference in 1866.

2nd. The formation of a Local Exhibition during the visit of the Conference, of Improved Chemical, Pharmaceutical, and Medical Apparatus and Utensils. Novelties in Pharmacy and Medicine, or anything in connection with the trade.

3rd. To propose a member of the Executive Committee.

4th. To form a Local Committee to co-operate with the General Committee in promoting the success of the Conference in Nottingham.

The meeting was large and influential. The chair was occupied by Mr. R. Fitzhugh.

The Chairman, on rising, said that no doubt the meeting was aware that it was the intention of the British Association to visit Nottingham next year, and with it came the Pharmaceutical Conference, which had been established three years, and held meetings in Newcastle, Bath, and Birmingham, with great success; and he felt sure that the chemists of Nottingham would use every effort to bring about a like result in their own town. He thought it better to mention that the Conference was established on a broad basis, and included both members of the Pharmaceutical Society, members of the United Society, and some influential men who were not members of either society. He feared that as regards the town, they laboured under some disadvantage, as Bath and Birmingham were so great attractions in themselves, one as a beautiful city, and the other on account of the variety of manufactures. Under these circumstances, he thought that they must all exert themselves in such a manner as to make the meeting as agreeable as possible.

The Chairman then alluded to the business of the meeting. He said,—It is proposed by Mr. Atherton to form a local exhibition, and he thought, as the chief object of the Conference was the advancement of pharmaceutical science, that it would be a step in the right direction; and as it was a new feature in the meetings, the subject was worthy of their most serious attention.

The Chairman then called upon the local secretary of the Conference to read some correspondence he had had with some of the officers of the Conference.

Mr. Atherton then read letters received from Mr. Reynolds, of Leeds, and Mr. Deane, of London, the ex-president; after which he gave a brief digest of the meeting of the Conference at Birmingham.

The following resolutions were then proposed, seconded, and carried unanimously:—

1. Proposed by Mr. C. Welch; seconded by Mr. John Burton:—"That this meeting cordially approves the objects of the Pharmaceutical Conference, and pledges itself to use every effort to promote the success of the visit to Nottingham in 1866."

2. Proposed by Mr. Greaves Ironville; seconded by Mr. W. Smith:—"That a local committee be formed to carry out the necessary arrangements, to consist of the following gentlemen, with power to add to their number—Mr. Fitzhugh, Mr. George Waterall, Mr. Woodward, Mr. J. Jenkins, Mr. Squire, Mr. F. White, Mr. Dudgeon, Mr. T. Harrison, Mr. Goodall, Derby, Mr. C. Bass, Mr. W. H. Parker, Mr. Beardsley, Mr. Shepperley, Mr. Dann, Mr. Greaves, Ironville, Mr. Richardson, Leicester, Mr. Heyward, Lincoln."

3. Proposed by Mr. Raynor; seconded by Mr. Jenkins:—"That as the proposed visit of the Conference will naturally entail a little expense in giving a proper welcome to so many distinguished chemists and pharmaceutists, a subscription be opened to defray necessary expenses."

4. Proposed by Mr. Shepperley; seconded by Mr. Patchett:—"That the name of Mr

Raynor be submitted to the executive committee as the representative of the chemists of Nottingham on that committee."

Mr. Atherton said, "You have heard from your chairman the objects of the Conference, and nothing could more increase its acknowledged value than to make it a little more practical. The Conference, as it now exists, is not *directly practical*, although it exerts a powerful influence for good over our every-day laboratory and dispensing counter work. But there are *many men* in our profession who care little or nothing for any scientific papers, even though they influence, or might influence, their every-day life. Such men (and I might here say that the objects of the Conference is to confer benefits upon all, and not merely men who dabble in or feel the influence of science), such men the scheme which I have proposed to the heads of the Conference, and which I now propose to you, will bind to our cause. It will attract men to the Conference who would not otherwise have joined, and at the same time will materially increase the interest of these yearly meetings to all. It is this, to establish an annual exhibition or collection of novelties and improvements in every department of our business which, as you are all well aware, includes besides Pharmacy (which of course is the chief science), chemistry, botany, materia medica, it touches zoology, and to a certain extent geology. I propose to collect chemical, pharmaceutical, and medical apparatus, instruments, utensils, and medicines, and anything else likely to interest the members of our profession, not forgetting such useful and ornamental articles (which I am sorry to say we chemists in the country have to deal in), which may be classed under the old facetious name given to this department a short time back, "morganic chemistry."

By the adoption of my scheme, the Conference will rapidly increase its number of members, and consequently its importance, and I feel convinced that nothing was ever promoted in connection with our profession more calculated to further the advancement of pharmaceutical science, to increase and promote the better education and standing of our members, and last, but not least, by these two combined, to increase our self-respect; and, believe me, it is by this means chiefly that we can hope not only to increase our profits, by preventing competition, but to elevate the *trade*, as it is now called, to the more dignified and profitable title of a profession, to which we should then be entitled.

I propose, subject of course to your approval, and subsequently to that of the Executive Council of the Conference in London, to send out circulars to France, Germany, and other continental countries, to America, and then to every town in the kingdom; also to advertise the objects of the exhibition, and, depend upon it, we shall have plenty of manufacturers and inventors only too glad to forward their inventions and manufactures to our meeting, free of expense, as a capital means of introducing them to so large and influential a body of our trade, and in future years this very exhibition will stimulate us to renewed energy, and will brighten up our ideas (dormant too long) by a spirit of competitive invention.

"The expense of carrying out these ideas of course belongs principally to the Conference; but the labour will fall principally on the Local Committee, which will be much reduced by unity of action. We shall of course receive great help from the General Secretaries of the Conference, Dr. Attfield and Mr. Reynolds, of Leeds. The principal expense will be in the packing and unpacking of the specimens forwarded. The rooms *must* be had for the Conference. I therefore see no reason why the Exhibition should not be quite successful; and, if it is, gentlemen, we shall have the satisfaction of knowing that we have inaugurated the first of a series of exhibitions which will materially influence the success of the Conference, and place our good old town of Nottingham in the front rank, as entitled to the thanks and the pleased remembrances of all interested therein."

Mr. W. H. Parker said, "Having been called upon to move a very important resolution, I have great pleasure in so doing, for several reasons. The first is, because I believe the B. P. Conference is one of those institutions which will greatly improve and elevate the trade,—placing it in its proper position in the eyes of the public, increasing their confidence and causing us to be *looked up to* as a profession, and not looked down upon as mere slaves of the *pestle and mortar;* and, secondly, but by no means the least important reason is, because I am firmly convinced it will tend (as its very first article of constitution expresses it) 'to promote the friendly reunion of the trade generally;' in fact I myself hope it will prove the combining power which shall cause the various members, of which our trade is at present constituted, to merge into one harmonious combination, and that the hitherto widely separated and incompatible elements of its composition, being brought together by the friendly invitations of the B. P. Conference, may work together for our mutual good and benefit.

"This, I believe, can only be attained by acting together for the accomplishment of so desirable an object, and, as a means to that end, the carrying out of the proposition contained in the resolution I hold in my hand will prove one of the best, and certainly one of the most interesting to all connected with the trade. I hope the scheme therein proposed will have the hearty approval and warm support it so richly deserves, and be carried out to its full extent, as its importance is really second to none. There is yet one more reason why we should be unanimous with regard to this matter, and that is, the proposition will emanate from Nottingham, and, for the ancient reputation of this good old town, I hope it will merit your kind consideration."

"5th Resolution. That this meeting cordially approves the idea of establishing a series of Annual Exhibitions, to be held at the same time and place and in connection with the Conference. Such Exhibition to consist of novelties and improvements in chemical, pharmaceutical, and medical apparatus and utensils; in chemical, pharmaceutical, and medical preparations, and anything likely to interest and improve the great body of the trade. That the scheme be inaugurated at the meeting of the Conference in Nottingham, in 1866. This meeting is further of opinion, that by this means, the Conference will assume an important practical character, which, combined with the present high standing of scientific investigation, must tend materially to interest all who have at heart the advancement of Pharmacy and well-being of those engaged in its pursuit. This meeting requests the Local Secretary of the Conference to present this resolution to the Executive Committee in London, *and to urge their adoption of the scheme.*" Proposed by Mr. W. H. Parker; seconded by Mr. S. Parr.

After some very interesting and practical remarks from Mr. Greaves, of Ironville, the resolution was put to the meeting and carried with acclamation.

A vote of thanks to the Chairman closed the proceedings.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held on the evening of Tuesday, December 5, at 17, Bloomsbury Square, the following members being present:—Professor Bentley, Dr. Edwards, Dr. Attfield, Messrs. Atherton, Brough, Deane, Hanbury, Haselden, Reynolds, and Schacht.

Mr. J. Rayner, of Nottingham, was elected to fill the vacancy in the Executive Committee. Mr. Atherton, as Local Secretary for the meeting to be held at Nottingham in 1866, brought forward the resolutions of a general meeting of the chemists of that town, proposing that an Exhibition of objects relating to Pharmacy should be held there during the next meeting of the Conference. The proposition was cordially adopted by the Executive Committee, who trust that the members generally will make early preparations to contribute to this important Exhibition.

The first draft of subjects for investigation for 1865–6, was then discussed and settled.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE GROWTH AND PREPARATION OF RHUBARB IN CHINA.

BY FRED. J. FARRE, M.D. CANTAB.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—It has often occurred to me that, while frequent attempts have been made, by personal inquiry and research, to discover the source and exact localities of the Chinese rhubarb plant, which have only resulted in deception and disappointment, we have in great measure neglected to avail ourselves of the more reliable information contained in Chinese books and manuscripts intended for the use and instruction of the Chinese themselves. An opportunity of obtaining such information was recently afforded me by Mr. Lockhart, who kindly supplied me with some valuable Chinese books, from which I extracted the facts which I have recorded at page 269 of Pereira's 'Manual of Materia Medica.' This information respecting the various localities of the rhubarb plant was sufficiently interesting to induce me to make further inquiries through the same channel. Mr. Lockhart undertook to convey my wishes to China, and if possible to obtain either the leaf, flower, or fruit of the plant itself. He failed to obtain these, as, like others, he had often tried and failed before; but he procured from the Rev. Griffith John, a missionary residing at Hankow, the following extracts from the 'Pun-tsau,' or Chinese Herbal, which, as well as the 'Pieh-luh,' which it quotes, is a work of good authority. Wu-pu, Tau-hung-king, Kung, Su-sung, and Sung-ki are Chinese writers. I am indebted to Mr. John for the translation. The notes are added by Mr. Lockhart.

I give the extracts from the 'Pun-tsau' exactly as I received them, that they may be available to others as well as myself; but to make them more intelligible I have subsequently rearranged and condensed them, and have finally drawn from them a few conclusions.

Extract from the 'Pun-tsau.'

1. In the '*Pieh-luh*' it is stated that rhubarb grows in valleys west of the Yellow River, and in the district of Lung-si in the province of Shen-si. The root is extracted in the second and the eighth months, and dried by means of artificial heat.

2. *Wu-pu* says: As to the rhubarb which grows in Si-chwan (Sz-chuen), and probably Lung-si, in the second month* its closed leaves are of a deep yellowish colour, and its stalk is more than 3 feet (Chinese†) high. In the third month the flower is yellow; in the fifth month the seed is black; and in the eighth month the root is extracted. The root, which contains a yellowish sap, is cut up in slices and dried in the shade (*i.e.* without either sun or artificial heat).

3. *Tau-hung-king* says that the Si-chwan rhubarb is not equal in quality to that of Lung-si in Shen-si; that it is very bitter in taste, and extremely black in colour; that that which is dried in the shade in the west of Si-chwan is superior to that which is dried in the sun in the north of the same province; and that that which is dried by means of artificial heat is slightly charred, and not equal to the rhubarb in the west of the province in resisting the woodworm.

4. *Kung* says that the leaf and stalk of the rhubarb resemble those of the Yang-ti plant. Its stalk, which grows to the height of 6 or 7 feet, is crisp and sour, and may be chewed raw. The leaf is coarse, long, and thick; the root is red, and resembles that of the Yang-ti plant; its shape is like a basin, and it is about 2 feet long; its nature is soft and moist, and it is easily destroyed by the woodworm. That which is dried by means of artificial heat is best. It is dried thus:—A stone is heated, and on it are placed the roots cut in horizontal slices about an inch thick. Being thus heated for a day, they become a little dry. A hole is then made in each piece, through which they are

* The Chinese months are lunar, the first beginning in February or March.—L.
† The Chinese foot is about 13 inches. It varies from 12½ to 14.—L.

strung together like *cash*.* The root thus cut and partially dried is then hung up in the shade till it becomes perfectly dry and fit for the market. The rhubarb which grows in Shen-si, Kan-suh, and in the west of Si-chwan, is all of good quality. That which grows in Shan-si, Chil-li, and other places to the north of these, is smaller in size, and not equal to that of Si-chwan in point of strength. What *Tau-hung-king* says about the Si-chwan rhubarb being inferior to that of Lung-si is a mistake.

5. *Su-sung* says, that rhubarb grows everywhere in Si-chwan, east of the Yellow River, and in Shen-si. The Si-chwan rhubarb is fine-grained. Next comes that of Shen-si. The plant of the latter produces green leaves in the first month, which resemble those of the Pima (*Ricinus communis*, Linn.), and are as large as a fan. The root resembles a Chinese potato,† the largest being the size of a basin, and from one to two feet long. In the fourth month a yellow flower opens; in the second and eighth months the root is extracted, and the black skin which covers it being taken off, it is cut in horizontal slices, and dried by means of artificial heat. The Si-chwan rhubarb is cut perpendicularly, which makes the slices resemble the tongue of an ox, and, hence it is called the ox-tongue rhubarb.‡ The uses and value of these two kinds of rhubarb is the same. Hwai-ngan-fu, in the province of Kiang-su, produces what is called Tu-ta-kwang, local rhubarb.§ The flower opens in the second month.

Sung-ki, who prepared some diagrams illustrative of the productions of Yih-chau, in Si-chwan, says that the rhubarb plant grows everywhere among the high mountains of Si-chwan. Its stalk is red; the leaf is large; and the root so large that it is used for a pillow in the medicine markets. He also states that the Lung-si rhubarb, in Shen-si, was considered best in his time. He lived in the Sung dynasty, between 1000 A.D. and 1270 A.D.

It seems that the Yang-ti plant has been mistaken by some for the rhubarb on account of its resemblance to it. Li-shi-chen affirms that it is quite a distinct species.

The foregoing account, as Mr. John observes in a letter to Mr. Lockhart, is far from satisfactory. The information is meagre and somewhat contradictory; nevertheless, it appears to me to add something to our former knowledge, and to throw a little light on the species, as it certainly does on the localities of the rhubarb plant. It is probably by collecting and comparing such information that we shall ultimately get at the truth. Avoiding repetitions, the above-mentioned statements may be arranged as follows:—

Localities.—The rhubarb plant grows in the provinces of Shan-si and Shen-si, which are situated respectively east and west of the Yellow River, in the upper part of its course, before it turns eastward towards the Yellow Sea. Lung-si, in the province of Shen-si, is one of its best localities. It also grows in Chil-li and other places further north, in Kan-suh, which borders on Mongolia, north of lake Koko-nor, and in the Nan-chan mountains, and everywhere among the high mountains of the province of Sz-chuen (or Si-chwan), which lies to the east of Thibet, and 3–400 miles north-east of the northern extremity of Birmah.

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* *Cash* is a foreign name for Chinese copper coins, called *tung-tseen*, with a square hole in the centre.—L.

† The Chinese potato is the *Dioscorea Batatas*, or White Yam, a long cylindrical root which has been recently introduced into England.—L.

‡ I believe what is intended is a thin diagonal slice, common in the shops, and which I used to buy. It might, by a lively imagination, be likened to an ox tongue. The others are transverse slices.—L.

§ The best rhubarb is Sz-chuen. The others, and especially that of Kiang-su, are called *local*, which implies inferiority.—L.

Description of the Plant.—The *root* resembles that of the Chinese potato, or white yam (*Dioscorea Batatas*). It is from one to two feet long, and thick enough to be used as a pillow. It is covered with a black skin, is soft and moist, and contains a yellowish sap. The plant puts forth its leaves in the first or second month. The unexpanded *leaves* of the Sz-chuen plant in the second month, are of a deep yellowish colour; those of the Shen-si plant, in the first month, are green, as large as a fan, and resemble those of the Pima (*Ricinus communis*, Linn.). Kung describes the rhubarb leaf as coarse, long, and thick. In Sz-chuen, the *stem* is more than 3 feet high in the second month. According to Kung, who does not mention the locality, the stem attains the height of 6 or 7 feet, and is red, crisp, sour, and eatable in its raw state. In the third or fourth month it opens its yellow flowers, which are succeeded in the fifth month by a black seed (nut). The root leaf and stalk of rhubarb, according to Kung, resemble those of the Yang-ti plant. This writer says that the root is red, but, in other respects, his description of it accords with that of the other writers.

Preparation and Drying of the Root.—The root is taken up in the second or eighth month, and the black skin which covers it is removed. It is then cut in slices, either longitudinally, as in Sz-chuen, or transversely, as in Shen-si and elsewhere, and dried in the shade with or without artificial heat. The following mode of drying is said to be the best:—a stone is heated, and the roots, cut in transverse slices about an inch thick, are placed upon it. By this means the pieces are partly dried. A hole is then made in each, and the pieces are strung on a cord, and suspended in the shade until they are perfectly dry and fit for the market.

Quality.—The rhubarb (*hwang*) which grows in Shen-si, Kansuh, and in the west of Sz-chuen, is all of good quality. That which grows in Shan-si, Chil-li, and other places to the north of these, is smaller, and not equal in strength to that of Sz-chuen. In Sz-chuen, however, the quality appears to vary, that which grows in the west and is dried in the shade being better than that which is dried in the sun in the north of the same province; while that which is dried by artificial heat is said to be slightly charred. Tau-hung-king, who makes the foregoing remark, adds that Sz-chuen rhubarb is not equal in quality to that of Lung-si in Shen-si; that it is black in colour, and very bitter. This, however, is altogether denied by Kung. Su-sung also says that Sz-chuen rhubarb is fine-grained, and next comes that of Shen-si. He adds, however, that the value of these two kinds is the same. Sung-ki, who lived between A.D. 1000 and 1270, says that in his time Lung-si (Shen-si) rhubarb was considered the best.

Notwithstanding the want of precision and agreement in the above statements, I think that, taken in connection with the extracts from 'The Rules of the Drug Trade in China' and from 'The Chinese Commercial Guide,' they will warrant the following—

Conclusions.

1. Rhubarb grows in many parts of the Chinese empire, but chiefly in Kan-suh south of Mongolia, about Ko-ko-nor, and on the Kwan-lun mountains, which form the northern boundary of Thibet; and also in the provinces of Shen-si, Shan-si, Ho-nan, and Sz-chuen. From the former districts the dried root reaches Europe at present by way of Moscow; from the latter it is conveyed along the Yellow and Yang-tse rivers to the ports of Shanghai and Hankow.

2. The descriptions of the plant are not sufficiently precise to show whether the roots of only one, or of more than one species are collected for me-

dicinal use. Any real differences in the descriptions are easily accounted for on the latter supposition. The contradictions, however, are more apparent than real. According to Kung the root is *red*, while Su-sung says that it is covered with a *black skin*, which is taken off. The black skin consists, as any one may see by examining the root of *Rheum palmatum* in the winter, of the black decayed bases of the sheathing petioles, which cover the rhizome, so that its red colour is not apparent until these are removed. The difference in the height of the plant and the colour of the leaves probably depends on age or locality. The most important feature in the description is the statement of Su-sung, that the leaves of the Shen-si rhubarb plant resemble those of *Ricinus communis*, the only known species of *Rheum* whose leaves admit of this comparison being *R. palmatum*. Su-sung particularizes the leaves of the *Shen-si* rhubarb, as if this was different from the Sz-chuen plant. Possibly he was only acquainted with the Shen-si plant, and therefore spoke cautiously. There appears, however, to be another species of rhubarb, which Kung calls the Yang-ti plant. This is said to be often mistaken for the ordinary rhubarb plant, on account of its resemblance to it; but Li-shi-chen affirms that it is a distinct species. It is, probably, also a species of *Rheum*, whose root, though known in the market as Yang-ti rhubarb, is smaller and of inferior quality, and therefore not called rhubarb by first-class dealers. Yang-ti rhubarb means sheep's-feet rhubarb, and is so called from a fancied resemblance to the feet of the sheep, as the Sz-chuen rhubarb is called, doubtless also from its shape and size, hoof or horse-hoof rhubarb. The Tu-ta-kwang or local, *i. e.* inferior rhubarb mentioned by Su-sung, which flowers two months earlier than the palmate-leaved rhubarb of Shen-si, may be a third species. There are a few characters which do not correspond with *R. palmatum*, or indeed with any of our cultivated species. The resemblance of the root to a basin is far from obvious, and the so-called seed or nut is usually a rusty-brown rather than black. The objection to *R. palmatum* being the source, or a source, of the officinal rhubarb has, I believe, been chiefly founded on the statement of Pallas that this species appeared to be quite unknown to the Bucharians, and that their description corresponded most nearly with *R. compactum*, the seeds of which were sent to Miller from St. Petersburg as the true *Tartarian* rhubarb. But still less has hitherto been known of the rhubarb which grows in *China* itself; and I think I have now shown equally good reason for believing that the best kind of Chinese rhubarb—namely, the produce of Shen-si, and probably also of Sz-chuen—is *R. palmatum*, which, notwithstanding all that has been said against it, has always been considered to approach most nearly to Asiatic rhubarb. Kung, who does not mention any locality, but compares the rhubarb to the Yang-ti plant, says that the stalk is crisp and sour, and may be chewed raw. *Rheum palmatum* is not cultivated in England for culinary use; but Mr. Robinson, of the Botanic Gardens, Regent's Park, informs me that he has seen it so used in Ireland.

EXAMINATIONS FOR CHEMISTS IN BUSINESS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I am sure the Council always look with pleasure upon the result of their efforts to afford their brethren already in business an opportunity of joining the Pharmaceutical Society. The examinations have been attended by many from various parts of the kingdom, who have found that the requirements were such as men in business, who were really acquainted with it, could readily satisfy, and that nothing was required but that which a little reading up would enable any man to meet who had any title to the name of a respectable and trustworthy dispenser. Those who were doubtful and hostile have gone away friends, approving the course adopted by the Council, and persuaded of the desire manifested to admit gladly into the ranks of the Society every one who could be received without frustrating the very purpose for which the Society was formed, and breaking faith with every one connected with it.

A little consideration will show that however all persons may wish to extend the advantages which only members now enjoy, there must be some method by which the worthy may be separated from the unworthy. No respectable man would value either the title "Pharmaceutical Chemist" or "Member of the Pharmaceutical Society," if it could be put up, blazoned in very large letters, as doubtless it would be, perhaps within a few doors of his shop, by every quack or venereal drug-seller who might call himself chemist and druggist. The respectable man would think a title so prostituted a disgrace instead of an honour, and would indignantly remove it. There must then be a test; this will be admitted on all sides, and the only reasonable tests that can be devised are either a certificate or an examination. The difficulties of the first and its unsatisfactory character are manifest. When a man's success in business is at stake, however unworthy, he will manage to get certificates somehow, and the quarrelling and charges of unfairness and want of impartiality which would arise, if the Council received some and rejected others, would be most harassing and troublesome. There is nothing that would do but examination. This is what the Government felt when they brought in their former Poison Bill; they contrived a plan of examination, and they would have compelled all, whether already in business or not, to pass *this*, before they would have allowed them to sell the poisons named in their schedule, unless they were members of the Pharmaceutical Society; and if they bring in another Poison Bill, as they very probably may, there is little doubt they will attempt to do the same thing again. Nothing will commend itself to practical men who sit down to devise a working scheme like examination.

It is sometimes said that the possession of a distinctive appellation by one chemist, when another who is his equal cannot display it, is an act of injustice, injurious to the man undistinguished, and misleading to the public. Let us try the justice of this statement by a parallel example. Let one scholar say to another, you have the "M.A." appended to your name, while mine must be without it; what unfairness is this—I am as good a classic as you are, perhaps a better, and fully your equal, as you know, in general learning, would not the answer be? If it be so, you can apply for the honour as I did, and no doubt you will have it; but if you have not thought it worth your while to seek it as I did, you have only yourself to blame if you have not the distinction, and my honourable name only declares to the public that *I* am worthy—it says nothing either good or bad about anybody else.

There is no doubt that the great advantage of exemption from juries is hoped for by all those who seek another Pharmacy Bill. This the Pharmaceutical Society have no objection to; they are quite willing that all their brethren should have that boon which they have already secured, and all attempts to gain it will have their aid and concurrence; but whether the Legislature will ever grant it is another thing. It must not be forgotten that the members of the present Government opposed it to the last; that the Bill was sent from Lords to Commons and Commons to Lords, in a way that no other Bill has been for many years; that only the determination of the Lords to retain the clause, coupled with the certainty that the Jury Bill would be lost, if it did not stand part of it, induced the Commons to yield an unwilling consent, and that the late Premier, Mr. Gladstone, Sir George Grey, and others, fought against it to the very last division. It seems hardly likely, therefore, that the present Government will bring in a Bill to do for the many what they refused to do for the few, and the fairest hope for securing this boon must still remain—an entrance through the doors of the practical examination of the Pharmaceutical Society. OPIFEX.

REMARKS ON THE NOMENCLATURE AND SOME PREPARATIONS OF THE BRITISH PHARMACOPŒIA.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Dear Sir,—Though I have every confidence in the gentlemen entrusted with the revision of the British Pharmacopœia, yet, as remarks have been made, and Professor Redwood seems to court inquiry, I venture to send you a few thoughts that have occurred to me in reading and thinking of the subject, which are at your service, should you think them worthy of a place in your Journal.

The application of the term hydrarg. chlor., formerly applied to calomel, to corrosive sublimate, is very much to be regretted. A few months after the publication of the B. P. a prescription was given to me to prepare, which ran as follows:—

℞ Hydrarg. Chlorid. gr. iv.
Sacchar. Alb. q. s. Misce bene et div. in pulv. viij. Signa, the Powders.

There could be no doubt which preparation of mercury was intended, but, on inquiry, I ascertained the powders were for a very young infant, and to be given at short intervals. Had they been dispensed according to the B. P., serious consequences would undoubtedly have occurred. The application of the term calomel has its enemies; though unobjectionable as regards theory, yet it might thwart the intention of the prescriber, as nervous patients might refuse to take a compound where they saw it plainly written. Either hydrarg. chlorid. mitis or hydrarg. protochlorid. applied to calomel, and hydrarg. bichlorid. or hydrarg. perchlorid. to corrosive sublimate, would be sufficiently significant.

Another subject of regret is the introduction of acid. nitric. 1·500, in lieu of 1·42. It was in the P. L., but the strength reduced in consequence of the representation of the disadvantage of employing so strong an acid by our revered friend Mr. Bell. A most respectable London house refused to supply me with this acid, on account of its dangerous character. The weaker acid answers very well for every practical purpose.

The infusum gentianæ is a different article to what we have been accustomed to know by that name. With a little additional spirit or a little aromatic tincture it might be named vin. gentianæ comp.

In the B. P. we have liquors, solutions, and volumetric solutions, which might be much more safely classed together with some of the formulæ of the former Pharmacopœias. How readily might the inexperienced substitute the solution of corrosive sublimate of the B. P. (forty times as strong) for the liq. hydrarg. bichlor., P. L.! This confusion and tendency to mistake might be obviated by careful nomenclature, carried out in a uniform manner, with the doses attached to such as were intended for internal use,—additions which would not materially increase the size, but to a great extent the value of the work. For instance, we might have—

Liq. Ammoniæ fort.	Liq. Ammon. dilut.
,, ,, Acet. fort.	,, ,, Acet. dilut., P. L.
,, ,, Carb. fort., P. L.	,, ,, Carb. dilut., B. P.
,, Calcii Chlorid. fort., B. P.	,, Calcii Chlorid. dilut., B. P.
,, Ferri Perchlor. fort.	,, Ferri Perchlor. dilut. (equal in strength to the L.)
,, Hydrarg. Perchlor. fort.	,, Hydrarg. Perchlor. dilut., P. L.
,, Iodi Co. fort.	,, Iodin. Co. dilut. (to correspond to Liq. Potass. Iod. Co., P. L.), etc. etc.

The sp. ammoniæ arom. is ordered to be distilled,—surely an unnecessary expense and trouble. Under the spirits, we have solutions of essential oils in rectified spirit, in the proportions of one of oil to nine pints of spirit, preparations differing much from the former spirits (P. L.); in the case of peppermint containing forty-seven, and in that of juniper ninety-five times the quantity of oil. Surely it would have been more advisable to have adopted the term essence, by which such solutions are already known in the trade and recognized by the Dublin College.

The ung. resinæ is ordered to be made of—

Resin, 8 ounces.
Yellow Wax, 4 ounces.
Simple Ointment, 16 ounces: melted together.

The 16 ounces of simple ointment is composed of—

White Wax, 4 ounces.
Prepared Lard, 6 ounces.
Almond Oil, 6 ounces: melted together.

The object of uniting yellow and white wax in this compound I cannot tell, but it strikes me it would be better to have ordered the proper quantities of each ingredient in the first instance and melt them together, to avoid the unnecessary application of heat.

Mr. Barber, in this month's Journal, advocates the employment of yellow wax in preference to white, in the preparation of ung. hydr. nitr. ox. It is not improbable but the healing qualities of the wax may, to a slight extent, be deteriorated by bleaching. I have, on more occasions than one, observed on mixing iodide of potassium with ung. cetacei, a brownish-coloured ointment result, owing perhaps to a minute quantity of chlorine being retained by the wax. This may affect delicate preparations, and, among others, the hydr. nitr. oxid. It is worthy of investigation how far the healing qualities of wax may be affected by bleaching.

The process given for liq. ferri perchloridi is troublesome and faulty, yielding different results to different operators. I cannot say it has yielded me a satisfactory product. The simple process in the London Pharmacopœia yielded a very much esteemed tonic, and, seeing we have in the B. P., perox. iron, dried at 212°, and pure hydrochloric acid, which dissolves it, there can be no great difficulty in propounding a formula for a solution yielding a certain quantity of peroxide of iron on addition of potash, containing a slight excess of acid, sufficient to keep it in solution.

Hoping these observations may induce others to communicate their ideas on these matters,

I remain, yours respectfully,
WILLIAM PROCTOR.

Newcastle-on-Tyne, Dec. 16, 1865.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—I have found the following modification of the B. P. formula for Lin. Saponis answer very well:—

℞ Sp. Vini Rect. 2 pints 4 oz.
Camphoræ $3\frac{3}{4}$ oz.
Ol. Rosmar. (e floribus) 9 fl. drachms. Dissolve.

℞ Sapon. Cast. Rasæ $7\frac{1}{2}$ oz.
Aquæ Dest. Bullientis 16 oz.

Digest in a wide-mouthed covered vessel in a warm place (about 90° Fahr.), agitating occasionally until it becomes semifluid. This will be accomplished in a few hours. Lastly, pour the *saponaceous* into the *spirituous* solution, and shake the bottle occasionally until complete solution is effected. In warm weather this will take place in a very short time.

It will be seen that the formula differs very little from the B. P., only in containing a little more water, and in the substitution of Ol. Rosmar. Flor. for Ol. Rosmar. Ang., but the mode of preparation is altogether altered.

I prepared some of this liniment five months ago, and up to the present time it has not congealed when reduced to 45° Fahr. The Ol. Rosmar. Flor. is very superior to the Ol. Rosmar. Exot., and 1 lb. can be bought for the price of 1 oz. Ol. Rosmar. Ang. There is scarcely any difference in the odour of Lin. Saponis prepared with it, and I imagine in every other respect it is quite as good.

In the case of a preparation, like Lin. Saponis, that is in such extensive demand and constant use, it is important that it should be supplied to the medical profession and the public at a moderate price; and if prepared by B. P. it cannot be supplied to surgeons at 3*s.* 6*d.* per lb., or retail at 4*d.* per oz.

But strict conformity to the B. P. is certainly desirable, and we know that the public will not pay an increased price for Lin. Saponis, B. P.; therefore, we must either ignore the B. P. altogether, or keep two kinds, the one for retail, and the other for dispensing; both of these methods are, for many reasons, highly objectionable.

If the Pharmacopœia is really to be our guide in this and all other officinal preparations, as it most certainly ought to be, it should contain formulæ and directions that will be likely to be strictly followed both by the wholesale and retail dealer, so that they may be universally adopted, and thus ensure uniformity in our preparations. Until such is the case, we shall, as now, be constantly having complaints from our customers of the different appearance, taste, etc., of the same preparation or medicine bought or dispensed at different shops; and this is a very unsatisfactory state of things, much to be regretted by the medical profession and pharmaceutists.

I do not maintain or wish it to be understood from this that a £. *s.* *d.* value should be put on the formulæ of the B. P.; on the contrary, I consider no time, trouble, or expense ought to be spared to make the best and most efficacious preparations that can possibly be produced.

My object in offering this formula is merely to show how a good liniment may be prepared in the spirit, though not to the letter, of the B. P.; and in making it I wished to carry out the instructions therein contained as far as possible.

Respecting the kind of *soap* to be used, I believe the *mottled* produces the best *liniment*, although the *white* is purer, and should be preferred in most other cases.

Yours respectfully,
AMICITIA.

WATERS'S QUININE WINE.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—My attention has been directed to your comments upon the sale of Orange Quinine Wine in 'Pharmaceutical Journal' of this month, and I must request permission to point out an omission in one of your extracts from the correspondence between myself and the Board of Inland Revenue, which not only materially alters the sense of the letter in question, but is calculated to mislead a large number of the vendors of this article.

The letter I allude to is dated Aug. 31st, 1865, and is quoted on page 297, and is as follows:—"The Board having had before them your further application of the 3rd inst., I am directed to acquaint you that it had appeared to them from their previous information that your preparation of Orange Quinine Wine was sold as a beverage, and not as a medicine. But after further inquiries, they are inclined to think that it is more properly classed with medicines, and that the patent medicine licence and stamped label are required for its sale."

This extract distinctly says that the article in question must be sold under the patent medicine laws, and in no other way; but the ensuing paragraph of this letter very materially modifies this, and goes on to say—"This, however, does not make any substantial difference in the decision of the Board as already expressed; they have already stated that if the patent medicine stamped label and licence are used they will not require a British wine licence duty to be taken out by the vendor of orange quinine wine; the British wine licence duty would be imposed only in cases where the vendor, by neglecting or refusing to use the patent medicine label and licence, might then show that he sold the orange quinine wine rather as a beverage than as a medicine."

This most clearly gives to vendors the option of selling it either as a medicine or beverage, as they please.

This is a most important point, and I should be much obliged if you would lay it before the trade.

I would also direct your attention to a point which has struck me very forcibly in reference the sale of this article by chemists, etc. It appears from Mr. Price's digest of the Acts you quote, that the first class of persons named therein, which are chemists, druggists, and apothecaries, are, by the Act 52 Geo. III., exempt from all the restraining and disabling restrictions, except that of the impost of duties on the third sort of things tabulated, and most certainly orange quinine wine is not one of them. Now this Act clearly, I think, exempts chemists, etc., from duty on its sale as a medicine; and I submit that the decision embodied in the letter of Dec. 3rd, 1864, from the Board of Inland Revenue, equally exempts them from the excise duty on it as a beverage; and that therefore it follows that the above trades may sell it without a British wine licence or the patent medicine label.

I should be glad if you would look further into this subject, and inform me if your views coincide with my own in this matter.

I am, Sir, yours respectfully,

ROBERT WATERS.

2, St. Martin's Lane, Cannon Street, London,
December 5th, 1865.

[We are decidedly of opinion that chemists and druggists may sell Waters's Quinine Wine without a British wine licence or a patent medicine stamp.—ED. PHARM. JOURN.]

IS CHLORODYNE SUBJECT TO A MEDICINE STAMP?

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

11, *Grey Street*, *Newcastle*, *Dec.* 21, 1865.

Sir,—I now have the pleasure of handing you a copy of my second communication with the Board of Inland Revenue, on the subject of Chlorodyne and the Stamp Duty.

Your readers will perceive with satisfaction that the Board allow all necessary freedom in the practice of legitimate dispensing: at the same time it must not be inferred that this liberty is extended to all sales of Chlorodyne with similar directions.

The prescriptions are copies taken from those which have been presented in the ordinary course of trade, simply withholding the names of the patient and prescriber.

BARNARD S. PROCTOR.

(COPY.)

"*Dec.* 1, 1865.

"*To the Honourable Commissioners of Inland Revenue.*

"Gentlemen,—I beg to thank you for your communication $\frac{\text{R 6134. S.*}}{\text{65.}}$

"In reply to its last clause, I beg to hand you Copies of Prescriptions selected from a number, to illustrate various ways in which Chlorodyne is prescribed by medical men, together with the directions which would accompany the medicine when sent to the patient.

"I further beg to explain that I do not propose to sell any of the medicines prepared according to the accompanying prescriptions, excepting to the patients for whom they were prescribed; and simply seek this information as a guide to my practice when other similar cases arise.

"Yours most respectfully,
"BARNARD S. PROCTOR.

Prescriptions.	*Directions.*
"1. ℞ Chlorodyne ℥ss. Aquæ ad ℥iv. M. Sumat ℥ss omni nocte. Jan. 11, 1864.	A tablespoonful to be taken every night.
"2. ℞ Chlorodyne ♏xv. Aquæ Puræ ℥ss. M. ft. Haust. pro diarrh. si opus sit sum. Apr. 2, /64.	The Draught for Diarrhœa, to be taken if required.
"3. Chlorodyne ʒss. Sp. Æther. Nitr. ʒi. Aqu. ad ℥i. M. ft. Haust. sed. nocte sum. Mar. 3, /65.	Draught to procure sleep, to be taken at night.
"4. ℞ Chlorodyne ℥i. (Collis Brown's) Sign. 15 drops to be taken in water occasionally.	15 drops to be taken in water occasionally.

* See 'Pharmaceutical Journal,' vol. vii. p. 318.

Prescriptions.	*Directions.*
"5. ℞ Chlorodyne (Collis Brown's) ʒii. Sign. Take twelve drops in water, and repeat in two hours if necessary.	Collis Brown's Chlorodyne. Take twelve drops in water, and repeat in two hours if necessary.
"6. ℞ Spir. Ammon. Co. ℥ss. Bismuth. Trisnitr. ʒii Chlorodyne (Collis Brown's) ʒii. Naphthæ Medic. ʒiii. Oxymel. Scillæ ℥i. Decoct. Senegæ ad ℥viii. M. ft. ℥ss, urgent. tussi.	A tablespoonful to be taken when the cough is troublesome.
"7. ℞ Chlorodyne ℥ii, (Collis Brown's). Send full directions. Oct. 15, 1865."	The directions supplied to the patient with No. 7 were the printed instructions supplied by the maker of the Chlorodyne, and stated in your last communication to render it liable to stamp duty."

(COPY.)

"*Inland Revenue, Somerset House, London, W.C.*
"*20th December*, 1865.

"Sir,—The Board of Inland Revenue have had under consideration your letter of the 1st instant, in further reference to the liability of the preparation called 'Chlorodyne' to Medicine Stamp Duty, when supplied in the manner therein described, as an ingredient with others in a medical prescription, and in reply I am directed to acquaint you that the dispensing of this preparation in the manner indicated would not subject the dispenser to a liability to the Medicine Stamp Duty.

"I am, Sir,
"Your obedient servant,
"J. SARGENT."

"*Mr. B. S. Proctor.*"

THE SACCHARIDE OF COD-LIVER OIL.

The following communication from Dr. Thiere, of Paris, addressed to Dr. Attfield, with reference to the subject of his paper on the "Saccharide of Cod-liver Oil," published in our last number, has been handed to us, and we publish it in full, thus affording the author an opportunity of stating what he can in his justification :—

"Sir,—Messrs. Roberts and Co., pharmaciens at Paris, who are agents for my powder (saccharide of cod-liver oil) have just submitted to me the article published in the 'Pharmaceutical Journal' of this month. It is right that I should relieve these gentlemen, as well as Messrs. Wilcocks and Co., from all responsibility. I repeat, therefore, that these gentlemen are my agents. I wished to have the value of this preparation appreciated by others besides my own patients. Its success affords ground for the conclusion that jealousy has called forth this article from your pen.

"In fact, this powder has been sold for many years in the houses of Messrs. Barclay and Co. and others, including that of Wilcocks and Co., who have never received any complaints, but, on the contrary, many letters of thanks from all parts. At the present time, when its good effects are being extensively propagated, the Pharmaceutical Society of London raises a disturbance. In my opinion, this indicates a further success, especially as in France its use increases more and more, without its receiving any aid from notice in the public papers.

"My formula is entered in the register of the pharmacy of Messrs. Roberts and Co., and these gentlemen can state whether my saccharide, of which sugar of milk is only the vehicle, does not contain sulphur, iodine in the form of iodide of potassium, bromine, and hypophosphite of lime. Moreover, they are intending to authenticate this preparation, which is now being submitted to analysis for that purpose.

"I shall be much obliged if you will get an article inserted in the next number of the 'Pharmaceutical Journal,' in justification of Messrs. Roberts and Co. and Messrs. Wilcocks and Co., so as to relieve them from all responsibilty.

"I am, etc.,

"Dr. L. Thiere.

"11*th Dec.*, 1865."

ANNUITIES FROM THE BENEVOLENT FUND.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—I addressed a letter to you, on the above subject, in October last, (about a week before the election of two annuitants took place,) and in the November number, page 296, my letter is kindly acknowledged; but no reply was sent to my inquiry.

In October last I received a voting-paper for the above election, and that paper states that "Persons eligible for Relief are such necessitous Members or Associates whose connection with the Society has been of not less than Four Years date, and such Widows and Orphans of Members or Associates as are in necessitous circumstances."

The same paper admits that the late George Goldfinch had not been connected with the Society four years at the time of his death; in fact, the only place where his name can be found in the list of members is in the twelfth volume of the Pharmaceutical Journal, at page 521, yet his widow is placed as one among four approved candidates. Can a widow acquire a claim on the fund, although her husband did not live to attain to such claim? In the November number Mrs. C. Goldfinch thanks her friends for their liberality. Was such liberality compatible with the rules of the Benevolent Fund of the Society? I admit that it is an important step gained for the members to know the names of persons obtaining relief. In the Journal for the present month, at page 302, I find that the Council have made a grant of £5 to the widow of a late member at Birmingham; of course, it is not intended that the members generally should know who the late member was, whose widow received £5 from the Council, "who, we all know, are honourable men." In dispensing charity, the left hand should not know what the right hand does. Should the Members and Council stand in the position of the two hands?

If it were possible, I should like to see a rule or bye-law, allowing members to *purchase* a small annuity, by sinking a sum of money in the fund, according to their age, seniority of membership, election, etc.

I am, Gentlemen,

Your obedient servant,

Joseph Leay.*

Chilcompton, Bath, December 9th, 1865.

* As to the non-appearance of Mr. Leay's letter of October 21st, in the Journal, we need

A CHEMIST AND DRUGGIST FINED FOR ILLEGALLY SELLING POISON.

This morning, Mr. Thomas Goodman, chemist and druggist, Bradshawgate, was summoned before the borough magistrates, there being on the Bench the Mayor (R. Stockdale, Esq.), Aldermen Heywood and Orton, and J. Cannon, Esq., to answer a charge of having sold "to one Catherine Joyce, a certain quantity of virulent poison, to wit, half-an-ounce of almond flavour, such sale not being made in the presence of a witness, and not having at the time of such sale correctly entered in a book the names and addresses of such person and witness, and the nature and quantity of the poison purchased, and the alleged purpose for which it was intended to be used." Mr. Hall appeared to prosecute, and Mr. Richardson defended. The case excited a good deal of interest, and several members of the trade attended, amongst whom were Mr. Blain, secretary to the Chemists' Association, Mr. G. E. Griffin, Deansgate, and others.

Mr. Hall, in opening the case, said this was a charge against Mr. Goodman for having on the 24th November sold half an ounce of almond flavour, the same not being sold in the presence of a witness or entered in a book. The summons was made out under the Local Improvement Act of 1854, the 38th section of which reads as follows:—

"If any chemist, druggist, or other person in Bolton, sell any virulent poison to any person, except in the presence of a witness, and do not at the time of such sale correctly enter in a book the names and addresses of such person and witness, and the nature and quantity of the poison purchased, and the alleged purpose for which it is intended to be used, every person so offending shall for every such offence forfeit a sum not exceeding £5; and the burden of proving that this enactment has been complied with shall rest on the person charged with such offence."

In this case he (Mr. Hall) should be able to show their worships that on Friday week a young woman named Catherine Joyce went into Mr. Goodman's shop and asked for a quantity of almond flavour, with which Mr. Goodman supplied her. As to what she did with it was a question entirely beyond the purposes of this prosecution; nor was Mr. Goodman in any way responsible for the use she made of it. The Legislature had wisely provided for the protection of the public in reference to the sale of articles of a poisonous character, and, in this instance, the poison (though the purpose to which it was to be applied might seem to be not entirely an improper one) had been sold without the protective regulations imposed by the Act being complied with, the article having been sold without any witness being present, and the sale of the article had not been entered in a book. In these cases the burden of proof that the conditions of the Act had not been complied with, rested with the defendant; it was sufficient for the prosecution to show that the poison was so sold.

Mr. W. E. Whitehead was the first witness, and said:—I am a confectioner, and have a shop in Deansgate. I have had a person named Catherine Joyce in my service, whom I discharged on Friday, the 24th ult. She left my place about a quarter past seven in the evening. I next saw her in the shop of Mr. Goodman, a little after half-past eight,

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only say, that containing but an analysis of the claims of the four candidates who were declared by the Council eligible, and a statement of the reasons which influenced his vote for one of them in particular, it would have been manifestly improper to publish it. All persons approved as candidates have a right to stand on their own merits, and all would have a right to complain if the claims of any were enhanced or depreciated in the pages of this Journal.

The question regarding the legality of the pension to Mrs. Goldfinch would more properly have been addressed to the Secretary, but we may add, that to us there seems no doubt on the subject. Members and Associates *living* must certainly have been connected four years with the Society. Widows and Orphans are rightly placed on a different footing, and there is no mention in the Bye-laws of anything to the contrary; they are described as "such Widows and Orphans of Members or Associates as shall be in necessitous circumstances." We can easily conceive, and honour, the motives which guided the framers of this regulation; widows and orphans are deprived of their natural supporters, and are in a far more helpless condition than men when overtaken by adversity.

The practice of withholding the names of recipients of casual relief seems to be only a proper consideration for the feelings of those persons, who, although needing assistance to-day, may, by energy and good fortune, recover their position to-morrow.—Ed. Pharm. Journ.

as I was returning from the Trinity Street Railway Station. Cross-examined by Mr. Richardson: The young woman had been in my service about three months. I do not know where she had been employed before. I had sent her on errands for me at various times, and occasionally for drugs, chiefly almond flavour, which we use for scenting puddings and confectionery generally. She has fetched almond flavour about three times or once a month. I have not served an apprenticeship to the confectionery business, and have only been in it about six months. I have sent the young woman Catherine Joyce to Mr. Griffin's, druggist, for almond flavour; she had no special order to go to Mr. Goodman's for it. I saw her in Mr. Goodman's shop about an hour and a quarter after she left my premises. I am quite sure it was her. I knew almond flavour was poisonous. We only use it in drops. It gives confectionery an agreeable flavour.

Police-sergeant Chadwick said:—In consequence of information I had received, I went to the shop of Mr. Goodman on Saturday last, and had an interview with him. I asked if he had sold any poison to a young woman last night. He replied, "Not that I know of." I then said a young women who had been seen buying something in his shop on the previous night, had died suddenly in the street. I said she was twenty-four years of age, of middle size, and rather stout. Mr. Goodman then said, "I did sell half an ounce of almond flavour to a woman of that description." I then asked him if it was poison, and he replied that it was poison in its pure state, but that it was so reduced when he sold it to the young woman that it was not poisonous.

Dr. Settle said:—On Sunday last I made a *post mortem* examination of the body of the young woman, Catherine Joyce. I examined the stomach and found it contained about six ounces of half-digested food, wich smelled very strongly of bitter almonds. We tested the contents of the stomach for the spirit, and we found it to be prussic acid, which is contained in the essential oil of almonds. It is my opinion that death resulted from prussic acid. Cross-examined: Almond flavour would be quite harmless if used in confectionery in small quantities.

Mr. Richardson said there would be no difference of opinion on the material facts of this case. There was no evidence to show that Mr. Goodman did sell almond flavour to the woman who had poisoned herself, though the circumstances attending the matter indicated that; but he should not rest anything on that point. Mr. Goodman admitted that almond flavour was sold as had been put forward by the prosecution, and that was the general practice of the trade, as would be evident by an extract he read from Dr. A. S. Taylor's 'Manual of Medical Jurisprudence,'* and he might add, that all the druggists in the town sold the article in the same manner as Mr. Goodman had done in this instance. It was quite clear that Mr. Goodman was in no way auxiliary to the death of the young woman, and no injury had been inflicted upon society in this case by the non-observance of the law, therefore he trusted their worships would be of opinion that a nominal penalty would suffice in this case. Mr. Goodman had done nothing more than follow the general practice of the trade.

Mr. Heywood said he thought large quantities should not be sold except to parties constantly using it. If sold promiscuously, it should be in very small quantities.

The Mayor (after a short consultation with his brother magistrates) said the Bench were

* In reference to Dr. Taylor's remarks on this subject it may be of interest, and the more so as a correspondent deals with the subject in our columns this morning, to give, not only the part read by Mr. Richardson, but the whole paragraph, which is as follows:—"The bitter almond itself is a poison, and it owes its poisonous properties to prussic acid. It is, however, a remarkable fact, that none of the acid exists ready-formed in it, nor is the poison ever produced except by the agency of water on the almond pulp. Thus, the very act of mastication produces from this pulp the poison which destroys life. There are one or two cases on record, wherein the almonds, when eaten in large quantity, have led to fatal symptoms and death. The essential oil has given rise to a great number of accidents, and has caused toxicologists to direct their attention to it. Its poisonous properties are entirely due to the presence of hydrocyanic acid, which is intimately combined with it. Five pounds of the almonds are said to yield about half-an-ounce of the oil, and the quantity of hydrocyanic acid combined in it, varies from 8 to 14 per cent. (Christison). It must, therefore, be regarded as an active poison." The doctor then gives several cases, and adds, "I cannot avoid remarking, that we have here another instance of the disgraceful state of medical police in this country, in the fact that a deadly poison like this, is allowed to be sold by confectioners and others for the purpose of giving flavour to pastry and liqueurs."

unanimously of opinion that a nominal fine would meet the ends of justice in this case. They would advise chemists and druggists, when selling poisons, however small the quantity, to enter it in a book in all cases. They should fine the defendant 5*s.* and the costs of the case.

Mr. Griffin rose and requested their worships to tell him what articles were included in the Act as poisonous, but was informed that was not a matter within the province of the magistrates.

BRITISH RAINFALL.

Mr. G. J. Symons, of 136, Camden Road, London, is desirous of our giving publicity to the following:—

"I have to ask your readers' attention for a few moments to a request on the above subject, the importance of which in relation to engineering and drainage questions is well known. It is now some years since I began collecting returns of the fall of rain—with what success I will mention presently, but my main difficulty has been to find out the persons who keep such records, and one of the most obvious sources of assistance is the public press; I now, therefore, ask from each and every journal in the British Isles their all-powerful aid. When the collection was first organized in 1860, scarcely two hundred persons were known to observe and record the rainfall; by steady perseverance, and the aid of a portion of the press, the number has been raised until there are now more than 1200 places whence returns are regularly received. Still I know there are many more, probably hundreds, who have either never heard of the establishment of a central depôt to which copies of all rain-records should be sent, or they have been too diffident to send them. It is of paramount importance to gather these, and make the tables yet more complete. I therefore beg leave, through your columns, to ask every reader to think for a moment if he or she knows any one who keeps, or has kept, a rain-gauge; or who has any tables of rainfall (or old weather journals) in their possession. And if they do know of such persons, I ask them on behalf of science, of my fellow-observers, and on my own behalf, to use every effort to secure their assistance, and to favour me with their names and addresses. We want old records, we want records for the past year, and from many parts of the country we want returns for the future, if a few persons will notify to me their willingness to assist, and to pay 10*s.* 6*d.* for the very cheap and simple gauge now supplied."

Obituary.

MR. SIDNEY APPLEGATE.

We regret to record the death of Sidney Applegate, one of the Junior Bell Scholars for the present Session.

Mr. Applegate was born at Bradford-on-Avon, Wilts. During his early life he gave indications of the possession of talent, which, had his life been prolonged, would doubtless have been matured by riper years. After obtaining several prizes at school and passing the Oxford Middle Class Examination, he was articled to his brother, Mr. Edwin Applegate, of Upper Holloway, and then passed the Classical Examination and became a Registered Apprentice of the Society.

In August of this year, having previously passed the Minor Examination, he competed for the Junior Bell Scholarship and obtained it, but it was soon discovered that his close attention to study had undermined his health, and, on his application, the Council granted him permission to attend only a portion of the usual time allotted to the studies connected with the Scholarship. His health, however, became worse, and on the day intended for his departure for the country he was seized with an attack, the result of epileptic disease of the brain, from which he never rallied. Mr. Applegate will be remembered by his fellow-students as a genial friend, and by the officers of the Society as a strictly moral and conscientious worker in his vocation.

MR. JOSEPH WALKER.

We have also to record the death of Mr. Joseph Walker, Pharmaceutical Chemist, Bootle, Liverpool, which took place November the 12th, 1865.

MISCELLANEA.

The Calcutta Botanical Gardens.—Dr. Anderson's official report of the damages caused to the Calcutta Botanical Gardens by the cyclone of the 5th of October, 1864, has only just been published, owing to the mass of detail it was necessary to collect. The document may be called a cry of despair. The gale was more violent at the garden than at Calcutta itself, owing to the place being nearer the centre of the cyclone, and more exposed to the full force of it. Few trees fell before 11 o'clock A.M., and none after 4.30 P.M., yet within this short space of time a paradise was converted into a wilderness. The great baobab-tree of Africa was uprooted, and came down with a crash that caused vibrations in the earth felt at a distance of some hundred yards. Three gigantic specimens of iron-wood, the oldest in the garden, none less than 150 feet high, were levelled to the ground. Many of the most picturesque parts of the garden, resulting from the grouping of trees, no longer exist. Of the whole fine teak avenue leading to Kyd's monument only two mutilated trees remain. Of the splendid grove of mahogany-trees, some of which were planted in 1796, thirty-one specimens are blown down. The iron-wood avenue, planted by Dr. Wallich, has suffered severely. The water, breaking through the river embankment, and flooding the grounds, helped to complete the ruin. The scene presented the morning after the cyclone outdoes description. More than one thousand trees, and innumerable shrubs, lay prostrate. Nothing had been spared. Trees that had not fallen were more or less stripped of their branches. Not a vestige of a leaf, flower, or fruit remained; the lawn, roads, and tanks were blocked up by trees and fallen branches, and hundreds of cartloads of straw had been carried by the water into the grounds. More than seventy years will be required to restore the garden to the splendour in which it was on the night previous to the cyclone. The most singular part about this devastation is that, of the two great classes of plants into which the vegetable kingdom is divided, the endogens suffered the least injury. This produced a striking effect on the scenery. All the exogens being laid low, the country about Calcutta appeared to be covered with only four kinds of trees, the bamboo, the cocoa-nut, the wild date, and the Palmyra.—*Athenæum.*

REVIEWS.

A Guide to the Treatment of Diseases of the Skin: with Suggestions for their Prevention. For the use of the Student and General Practitioner. Illustrated by Cases. By Thomas Hunt, F.R.C.S., Surgeon to the Western Dispensary for Diseases of the Skin. Eighth Edition. London: T. Richards, 37, Great Queen Street. 1865.

The author of the present volume is well known as a successful practitioner in the treatment of Skin Diseases. The fundamental principles of the author's practice are—"belief in the constitutional origin of chronic skin-diseases, of the general inefficacy of topical treatment, of the necessity of reviewing the whole condition of the patient's health and rectifying what is wrong *before* adapting any specific treatment, and the absolute necessity of arsenic as the final remedy."

The present edition (the eighth) has been carefully revised, and some new chapters have been added "*On Ring-worm and other Diseases of the Hairy Scalp*," and "*On Diseases of the Nails.*" To all who require a concise and practical volume On the Treatment of Skin Diseases, the present work may be strongly recommended.

The Fairy Tales of Science. A Book for Youth. By John Cargill Brough. With Sixteen Illustrations by Charles H. Bennett. Second Edition, revised by the Author. London: Griffith and Farran, St. Paul's Churchyard. 1866.

The object of the author will be seen by the following extract from his preface:—"To place before the youthful student a compact and concise compendium of the leading and most universally important branches of science, has been my principal object in the preparation of this little volume."

"To adapt the work to the capacity of all, I have endeavoured to divest the principal subjects treated in it, of hard and dry technicalities, and to clothe them in the more attractive garb of fairy tales."

For essentially popular and sensational works on science, as a general rule, we have a great dislike, as they are for the most part compiled by those who, while possessing great powers of description, are almost entirely destitute of scientific knowledge, and as a necessary consequence we have strung together in the same volume a collection of all the marvels of the present and past ages of science, whether true or false, treated of in attractive language. Such works cannot but produce infinite mischief to the young student, by storing his mind with much that is not true in science, but which, from the pleasing manner in which it is conveyed, makes a deep impression upon his memory, and is difficult afterwards to eradicate.

Our objection to such works, however, only relates to their mode of execution; for it cannot be doubted that when true to science, and not written simply to amuse, they are eminently useful to the youthful student, not only by the information they afford, but by inciting him to look deeper into the sciences upon which they treat. After perusing the present volume we are glad to state that while the truths of science are presented in an attractive garb, we find nothing retained simply because it appears marvellous, and which the progress of science has proved to be untrue. We can cordially recommend this little volume to parents and others as a reliable and useful guide to put into the hands of youthful students.

BOOKS RECEIVED.

Outlines of Elementary Botany for the Use of Students. By Alexander Silver, M.A., etc. London: Henry Renshaw, 356, Strand. 1866. 12mo. Pp. 381.

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 of 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.

Dr. Burrows (President of the General Council of Medical Education and Registration of the United Kingdom) and Dr. Francis Hawkins (Registrar) had an interview with the Right Hon. Sir George Grey, at the Home-office, on the 9th of December, on the subject of the amendment of the Medical Act of 1858.

Sale of Methylated Spirit.—In consequence of the threatened prosecution of several Chemists in the country, we beg to again remind our readers that Methylated Spirit cannot legally be sold without a licence, the cost of which is £2. 2*s*. per annum.

U. (Rochdale).—*Liquor Ferri Perchloridi.*—To make this solution as recommended by Dr. Attfield (see Pharm. Journ. vol. vi. 2nd series, p. 405), add 5¾ oz. of the anhydrous solid perchloride to water (not water to it), so as to form half a pint of liquid.

M. P. S.—*Litmus Paper.*—The solution for preparing Litmus Paper may be made in the proportion of 1 ounce of litmus to 8 ounces of boiling distilled water.

S. N. (Northampton).—The question is one for a lawyer to answer.

A. (Kensington).—*Syrupus Quinæ Iodidi.*—℞ Potassii iodidi ʒiij; aquæ destill. ʒiss: solve. ℞ Quinæ disulph. ʒiiss; aquæ destill. ℥j; acid. sulph. dil. q. s.: solve. Mix the solutions, collect the precipitate, and dissolve in 36½ ounces of simple syrup.

"*An Essex Druggist*" and *Dr. M'Cormac* are thanked for their communications.

Inquirer (Brighton).—Pereira's 'Manual of Materia Medica and Therapeutics,' and Bentley's 'Manual of Botany.'

Mr. Brady's and Mr. Lowe's communications are unavoidably deferred until next month.

Erratum.—Pharmaceutical Meeting, Edinburgh, page 307, line 3, *for* "Hemp, President," *read* "Kemp, President."

Wanted, January, February, and June numbers of this Journal, 1865. Full price given. Apply to Elias Bremridge, 17, Bloomsbury Square.

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.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VII.—No. VIII.—FEBRUARY 1st, 1866.

THE SUITS IN CHANCERY RELATING TO BETTS'S CAPSULES.

If any of our readers should have thought, because for three or four months we have had nothing to say about the law proceedings, threatened and in progress, to which innocent dealers in articles to which metallic capsules are attached have been subjected,—that therefore all cause for complaint against the originator of these proceedings, and all fear of further annoyance from the same source, for past, present, or future transactions in business of every-day occurrence, have been satisfactorily settled and permanently removed,—we are sorry to say they have calculated upon a result that is not in accordance with the facts of this extraordinary case. The suits in Chancery, which have been instituted against a large number of retail dealers for selling articles capped with metallic capsules, on the ground of such capsules being an infringement of Mr. Betts's patent, are still proceeding, and, as usually occurs in such cases, the issue is uncertain, excepting that heavy law-costs will necessarily be incurred. We believe that all the defendants in these suits are innocent of any intentional violation of the law. They have none of them made any capsules, nor have they knowingly purchased them of makers who infringe Mr. Betts's patent rights. It is on this assumption, and with this assurance, that we have advocated, and continue to advocate, their cause. Several of them are Pharmaceutical Chemists, and as such are entitled to advice and assistance from the Journal which is devoted to their interests. The following letter, addressed to the Secretary of the Pharmaceutical Society, in answer to inquiries made with the view of supplying information to members throughout the country, will tend to show how the case now stands, and what course it is proposed to pursue with reference to the pending suits:—

"1, *East India Avenue, Leadenhall Street, London, E.C.*,
"*January* 17, 1866.

Elias Bremridge, Esq.,
"*Secretary Pharmaceutical Society.*

"Dear Sir,—In answer to your inquiries respecting the present position of Pharmaceutical Chemists with regard to the sale of articles capped with metallic capsules, we beg to enclose copy of a highly satisfactory opinion written by Mr. Eddis, the learned counsel who settled the answers of seventeen retail chemists defendants to suits by Mr. Betts.

"We concur in Mr. Eddis's opinion, and in accordance with it purpose continuing the defence in the cases of those gentlemen who have instructed us; but as Pharmaceutical Chemists in general are, no doubt, more desirous of not being defendants than of being successfully defended, we again convey an expression of opinion that the only course free from the annoyance of suit is neither to keep in stock nor to take into stock any capsuled article.

"We mention that an instance recently came under our notice of a tradesman thinking himself safe where he removed capsules at the time of sale: such was inaccurate,—the receiving of capsuled articles into stock, or keeping articles with capsules on them, may be held to be using capsules.

"We also mention having received positive information that an agent has recently travelled through the West of England with the object of purchasing capsuled articles.

"We are, dear Sir, yours truly,
"FLUX AND ARGLES."

COPY OPINION.

"*Re Betts Suits.*

"I am of opinion that the plaintiff will not succeed in these suits against retail dealers.

"Of course he could not do so if he failed in establishing the validity of his patent, and the facts stated in the answers show that it has been by no means so clearly established, either at law or in equity, as is represented in the bills. But whether and to what extent the specification of Dobbs disclosed an invention which destroyed the novelty of Betts's patent is a question of evidence and detail upon which I have at present very imperfect means of forming a conclusion.

"It appears to me, however, that the nature of the invention or process claimed by the plaintiff will itself prevent a court of equity giving him the aid he asks as against retail dealers. It is not pretended that capsules composed entirely of tin are patented articles, and yet it is, I think, admitted by the plaintiff's specification, and is, I understand, capable of distinct proof, that capsules made according to the process which his patent protects, present externally precisely the same appearance with, and are undistinguishable from, any other tin capsules. It follows, therefore, that the retailer of capsuled articles has no means of ascertaining whether the capsules are patented or not, except by pulling them to pieces and thereby destroying their use, so that an injunction to restrain the infringement is virtually an injunction to restrain the use of capsuled articles altogether.

"I think that a patentee, before he can claim the assistance of a court of equity to protect his patent, is bound to show that the patent is of such a nature as to give the party against whom the injunction is sought the means of knowing when the infringement is committed, and that where the patentee cannot do this, his patent would be held only to extend to the process of manufacture, and not to the completed and undistinguishable product.

"This view is strengthened by the fact that the plaintiff appears not even to have adopted the precaution of invariably affixing to his capsules a distinctive mark, and thus every criterion of distinguishing the plaintiff's article is wanting.

"Under these circumstances, the present suits seek a relief far more extensive than has ever been granted before by a court of equity, and which such a court would, in my opinion, be most unwilling to grant, where it can only protect a patented article by virtually annihilating an important branch of trade which includes many articles not patented at all.

"A. S. EDDIS.

"*Lincoln's Inn, January* 9, 1866."

We have no doubt the opinion of Mr. Eddis will be generally read with as much satisfaction as its perusal has afforded us. The points referred to in it are those we have relied upon as affording a justification of the course pursued in defending the suits. We have no wish to upset Mr. Betts's patent, or in any way to contribute to such a result; on the contrary, we should be glad to see Mr. Betts, in a fair and legitimate way, reaping the reward to which he is entitled for his invention; but if the suits now pending be pressed against the defendants, every available defence will, of course, be resorted to by counsel, and it appears that the validity of the patent is not unassailable. The strong and principal ground of defence, however, against the proceedings of the plaintiff appears to lie in the fact that Mr. Betts has no exclusive right to the manufacture of capsules, but to the manufacture of a certain metal which may be used for making capsules; and that capsules made of this metal are undistinguishable in appearance from those made of pure tin, which are not protected by any patent. In cases of this description, where the patent is infringed, the remedy of the patentee should be against those who produce, and not against those who, without any guilty knowledge, use the article produced. Suppose, for instance, that some manufacturer were to make iron by Bessemer's process without a licence, and that this were made into knives, scissors, and other articles, which could not be distinguished from articles made of ordinary iron, would it be right that retail dealers into whose hands such articles might pass in the course of business, or the public who might purchase them for use, should be indiscriminately proceeded against for infringement of Bessemer's patent? Yet such a proceeding would hardly differ from that which has been adopted by Mr. Betts against innocent dealers in articles to which capsules are attached, which, it is stated, have been made by Mr. Betts's process, but not with his licence or authority. Capsules of pure tin are frequently used, and these are not secured by patent. Betts's capsules consist externally of pure tin, and cannot be distinguished by appearance from the others. Mr. Betts generally affixes his name to his capsules, but many capsules of his manufacture have been issued without any such distinguishing mark. On the Continent capsules are made by Mr. Betts's process, the foreign patents having expired, and these also have usually no maker's name attached to them. Many capsuled articles are imported from abroad with capsules made of Betts's metal, but not made by Mr. Betts or with his licence, and we believe he has the power, under his patent in this country, of preventing such importation. But there are also many capsuled articles imported from abroad with capsules made of pure tin, which are not an infringement of this or any other patent, and over these Mr. Betts has no control. Now, what we contend for is, that it lies with Mr. Betts to trace out and discover the manufacturers or importers of those capsules which he considers to be an infringement of his patent rights, and to stop the infringement at the fountain-head, instead of attacking retail dealers, who cannot be expected to have all the capsules attached to the articles sold by them submitted to such examination as would prove whether they be made of Betts's metal or not, and if made of Betts's metal, that they should ascertain whether it was made by Mr. Betts or under a license from him. Mr. Betts, however, seems determined to persist in the course he has adopted. The suits in Chancery against seventeen retail dealers are still proceeding, while heavy costs are accumulating; and we are informed upon undoubted authority that an agent of Mr. Betts has just finished a three months' tour through the West of England, during which he has made a series of purchases of capsuled articles from druggists and others, against whom it is very probable that legal proceedings will be instituted. It will be seen that the case, as it stands, is one affecting the retail drug trade generally, and that no dealers in articles to which metallic capsules are attached can be considered safe from the vexatious proceed-

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ings adopted. The advice of Messrs. Flux and Argles is, that as the only security against the annoyance of suit, no articles should be kept or taken into stock that have metallic capsules attached to them. This, however, relates only to the future; but who knows what there is in store for him with reference to the past? At a meeting held at 17, Bloomsbury Square, on Tuesday, the 16th of January, it was resolved "That the committee having heard the opinion of counsel read by Mr. Flux, are satisfied that no compromise should be entered into with Mr. Betts, but that the actions should be defended in court." So entirely is this felt to be a public question affecting the whole trade, that several of our members, who are not themselves defendants in the suits, have subscribed to a defence fund; and we urge upon the members of the trade generally that the seventeen innocent retailers who are preparing to fight this battle for themselves and their brethren, ought not to be allowed to do so wholly at their own cost. Mr. Bremridge, of 17, Bloomsbury Square, who has undertaken to act as honorary secretary to the committee, will receive the names of subscribers to the defence fund, and subscriptions may be sent to him by post-office order or otherwise.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *January 3rd*, 1866,

Present—Messrs. Bird, Deane, Hanbury, Haselden, Hills, Morson, Sandford, Savage, Squire, Watts, and Waugh,—

The following were elected—

MEMBERS.

Swenden, James ....Darlington.
Magor, Martin......................................Highbridge.
Turner, George ....Honiton.
Wootton, Alfred Charles ....Luton.
Gowland, George Robert ....Sheffield.
Gowland, William ....Sheffield.
Manning, Richard James ....Wells.

The sum of £20 from the Benevolent Fund was granted to the widow of a late member of the Society at Ramsgate.

The following communication was received from the United Society of Chemists and Druggists:—

"Sir,—I beg to enclose herewith, by order of the Executive Committee, a copy of a Resolution which was adopted at the Annual Meeting of the United Society held Nov. 23rd, 1865, and ordered by that Meeting to be sent to the Pharmaceutical Council.

"I am, Sir, your obedient servant,
"C. BUOTT, *Secretary*."

"*Elias Bremridge, Esq., Secretary,*
"*Pharmaceutical Society.*

(*Copy.*)

"RESOLUTION:—

"That this Annual Meeting confirm the recommendation of the Provincial Associations at Liverpool, Manchester, Sheffield, Leeds, Hull, Bradford, Bristol, Oxford, Bolton, Newcastlk-on-Tyne, etc., to make the first seven clauses of the Chemists and Druggists Bill

No. 2—as approved of by the Select Committee of the House of Commons—the basis of any future proceeding in the name of the United Society, in case the Pharmaceutical Society decline to co-operate upon the condition of the self-government of the Trade being secured by Representative Election.

"Unanimously adopted.

"C. BUOTT, *Secretary.*"

The communication having been considered, the Secretary was instructed to forward to the Executive Committee a copy of the following Resolution :—

"That the Council of the Pharmaceutical Society have no idea of recommending any measure to Government for the regulation of chemists and druggists which shall not give to all registered chemists and druggists a voice in the election of the governing body."

EXAMINATION, 17*th January*, 1866.

MAJOR (Registered as Pharmaceutical Chemists).

Barnes, Lawrence Robert..............................Preston.
Braund, Henry Humphrey John ....Crediton.
Rowe, Robert...Yeovil.
Thomson, Denzil ....Worcester.
Towerzey, Alexander ....London.

MINOR (Registered as Assistants).

Akehurst, Arthur Frederick ....Brighton.
Coleman, Alfred ....Norwich.
Dunkley, Edward ....Northampton.
Horner, Thomas Barker...................................Woolwich.
Jones, Rowland Pritchard...............................Llanrwst.
Owen, William Hurdon...................................Holsworthy.
Provost, James Ashton ....Huntingdon.

REGISTERED APPRENTICES.

Name.	Residing with	Address.
Dresser, James	Mr. Dresser	York.
Gudgen, Frederick George	Mr. Gudgen	Kimbolton.
Harris, John	Mr. Boothby	London.
Jones, Edward	Mr. Davies	Aberystwith.
Lockwood, Charles H.	Mr. Clift	Dorking.
Morgan, John Richard	Mr. Cole	Aberystwith.
Nicholls, Sampson	Mr. Spargo	Falmouth.

PROVINCIAL TRANSACTIONS.

PROCEEDINGS OF THE LIVERPOOL CHEMISTS' ASSOCIATION.

The second general meeting of this body was held at the Royal Institution, on the evening of October 26, 1865 ; the President in the chair.

Messrs. H. Davison, J. E. Tomlinson, C. Wm. Bannister, Robt. Sturdy, and S. Wolfenden were duly elected members.

The Secretary remarked, that in the decomposition which took place in the production of the "Pharaoh's Serpent" the sulphur and mercury were not entirely volatilized, as alleged at the last meeting; in fact, only a very small proportion of these components was expelled, the chief portion remaining as sulphide of mercury. The President exhibited a sample of tincture of steel impregnated with, as was supposed, chloric ether, also a foreign prescription. The Vice-President exhibited two forms of Dr. Clarke's "Spray Distributor," made by Mr. Wood, of Church Street, and explained the peculiarity of their construction. Dr. Edwards exhibited a Browning spectroscopic eye-piece, adapted to the microscope, and delivered a short address in relation to the examination of bodies by spectral phenomena, and the benefits which the physiological and chemical investigator were likely to derive from adaptations and inventions such as that exhibited. In the absence of Mr. Ince, Dr. Edwards read the following paper on—

"INDUSTRIAL PHARMACY."

Gentlemen,—The dispensing counter which I have had the pleasure of presenting to your Association is designed to meet the ordinary requirements of a London retail establishment, the bottles, papers, jars, and sundries having been selected with this view.

I am told that some of its arrangements will be regarded as a curiosity elsewhere; but gentlemen living in the excelsior atmosphere of a place like Liverpool, must make large allowance for their brethren who have to work in a less favoured centre. The points aimed at in its construction are as follows:—

1. Great convenience in little space.

2. The counter is made in sections of 3 feet 3 inches, each being complete in itself, and designed for one dispenser. The left-end panel is moveable so as to adapt or alter the gas and water services.

3. The proportions have been carefully determined. The counter is neither so low as to prove injurious to the assistant, nor yet so high as to be inconvenient. The screen is arranged so as to protect the dispenser from intrusion without rendering him invisible. The minor details of arrangement must be varied to meet the wants of each particular establishment. I lay particular stress on the third observation. The height of the dispensing counter is a point occasionally neglected. It may indeed be seen so low as to be most injurious to the health of the assistant; sometimes this is avoided by the use of a high desk for writing, copying prescriptions, or directing; but the stooping habit, inevitably contracted by habitual dispensing on a low counter, still remains unremedied. A good carpenter, with a few hours' work, would speedily remove the evil.

One thing at least this counter is meant to show, namely, that oak and iron need not be rigidly excluded from a druggist's shop. Oak is very clean in use, most durable, and not unattractive in appearance. A little iron scroll-work, judiciously introduced, gives an artistic finish to an otherwise heavy structure; and I believe that the combination of light-coloured wood and iron may be ventured on by the pharmaceutist of the most æsthetic tendencies, who has an equal aversion to what is mean and bare on one hand, or gaudy on the other.

Liberavi animam meam. This counter is the text; listen for a few minutes to the sermon. There is a pressing want of an Industrial Museum of Pharmacy, a collection so arranged that the humblest pharmaceutist might be brought into direct contact, not only with the best forms of chemical apparatus, but with the most desirable shop-implements and modes of decoration.

Such an establishment would promote the immediate interests of the man of business, and the man of science. Further, it would create a school of excellent workmen, who, having a definite aim before them, would devote their special energies to the industrial claims of Pharmacy.

Take as an opening illustration the erection of a modern druggist's-shop. First, that well-meaning man, the medical shop-fitter, brings a deep, closely-grained glass screen, which, being inserted in the window, effectually excludes the view. Inside he plants the counters, on which he piles huge erections, called glass cases, all of which fade into insignificance beside that Mont Blanc of Pharmacy, which is a desk behind, and in front an arcade of fancy articles. Should there be any ground-space left, it is instantly filled up with some choice erection; the theory of the fitter being, space must be occupied. Why is the light excluded from a druggist's shop? Why may not customers look in? Why not leave room to breathe? Why are assistants condemned to spend their days behind a barricade? There is but one answer,—this is the result of the tyranny of routine; the fitter has carried out that which inexorable custom has prescribed.

Gentlemen resident in Liverpool, surrounded by the signs of universal progress, may be pardoned in thinking more highly of the present than the past; and yet our forefathers had the courage to let the light of day into their shops, and to attend to appropriate ornament, leaving the system of overcrowding to the century in which we live.

Look at this engraving, representing in its way a perfect shop, spacious, yet not ugly, convenient and excellently arranged. Moreover, the laboratory is where it should be.

True, in their 'Catalogus Chemicorum et Galenicorum' we find Viperæ Siccat. and Vinum Viperinum, together with a selection of Materia Medica which would not meet the approval of Plough Court; yet that master, sitting quietly behind his desk, was wise in his generation, being persuaded that light and space and decoration were not three high-roads to his ruin.

It is clear, then, that even in shop furniture there is a style to be avoided, as well as a style to copy. Should we be worse chemists, or understand our business less, had we a good collection of plans, drawings, models (working or otherwise); in short, the whole series that would be included in the words druggists' fixtures?

But it is whispered, allow the trade fitter to know his own business; that is precisely what we want—allow him; for, up to the present moment, he has not had the chance, having nothing else as yet to guide his taste or form his judgment than his own discretion and the dictates of routine. For him specially would an Industrial Museum be a gain, supplying him with an energetic stimulus for exertion, and bringing him face to face with his own public. Nor least would be the personal advantage that would result from th study of different styles of work; the reign of mannerism would be ended, and the interest both of the druggist and the fitter would be mutually advanced. I am aware tha I shall excite a smile when I pass to minor considerations. I console myself with the reflection that Faraday wrote on the art of lighting fires, and that Professor Redwood has or had, a lecture on the mystery of making pills.

The popular symbol of the druggist is the pestle,—its use is to combine ingredients into pills, and it is supplied by the druggist's sundryman. He sends the well-known article, broad at the base, gradually tapering to the handle. This instrument is ingeniously constructed so as to disperse and not combine the pill mass, with this additional advantage, that the leverage is reduced to its minimum. Large houses order their own pestles from other than pharmaceutic centres, and, in my dispensing counter, you will observe mortars wanting pestles, not from any want of liberality on the part of Dr. Edwards, but simply because the right pestle is not ready for the right place.

Take, if you will, the short spatula also for making pills, of which there should exist two kinds, one for service in the mortar, the other for working on the slab. To this day, the first one only is provided. When a new assistant enters on his duties, with that confiding trustfulness which accepts whatever comes, he does his slab-work with the regulation spatula, stiff certainly, but long and narrow; no sooner does his verdant character assume a lighter hue, than *accidentally* he breaks a long dispensing-spatula, simply because he gets a useful shape, short, straight, not rounded off, and very broad,—an implement of which the druggist's sundryman knows nothing.

Labelling is worth at least a passing notice, though the details of the subject seem almost too obvious to be mentioned. A label should be legible, and that is the best label which is read most easily. I am not sure that we have done wisely in having abandoned the old black and white plain painted label with which our ancestors were content, but the present taste demands more ornament, and will scarcely tolerate such rigid utilitarian practice. Still, the lettering of the label should first strike the eye, and not a mass of gilding; nor can any predilection for outward show justify the fantastic and florid specimens from Paris. I am bound in honour to admit that for acid bottles* and essential oils, there is no label equal to the black letter on white enamel as now imported from the other side of the Channel. Theoretically the best label is the one printed in straight lines, one underneath the other, thus:—

TINCT.
CARDAMOM.
COMP.

The general aspect of this label is however too severe. I still incline to think that there is no better form than that indicated on the other side.†

But when we advance to higher considerations, and try to grapple with the difficulties which beset our path, the subject rises into far graver importance.

The claim for an Industrial Museum is urgent and imperative when we leave behind

* English manufacturers are endeavouring to imitate this design, but the white ground is as yet inferior.

† Drawing given in the original paper.

accessories and accidentals, and provide for the realities of our profession. Where can we at present learn how best to build a furnace, to erect steam apparatus, or to adapt gas to the general purposes of Pharmacy?

I myself believe strongly in the open fire, when properly managed; but let the sharpest man in Liverpool proceed to build a furnace, what time, what money he will waste, till by repeated alteration he buys experience at the cost of previous failure. I know this personally, and therefore am the more anxious that successors should be spared the same annoyance. Let us have an Industrial Museum, and inscribe, as a motto on its walls, "Nemo sibi vivat."

Steam demands our first consideration,—its work is beautiful though costly; yet, notwithstanding its manifest importance, there is but one name before the public (and that mainly by advertisement), of an engineer who has turned his special attention to steam as applied to Pharmacy. I deplore this state of things for him, and us, and steam,—the plain reason of its being out of sight, is out of mind. Druggists, as a body, know nothing of steam apparatus, except as regards its theory in books. They hesitate, and wisely, to adopt a system with which they are not practically acquainted. But let us have before our eyes, at least in model, the best work of the various best engineers; let us have the opportunity of examining at leisure sensible forms of stills, steam pans, steam funnels, steam drying-rooms, steam apparatus generally, and who will be the loser, the pharmaceutist or the manufacturing engineer?

This time a voice comes from Cheltenham (Pharm. Journ. Vol. IV. p. 426, second series):—"Is it possible, that at this present moment, each one is left to flounder through his own series of failures and misfits, without the opportunity of seeing a real working model suitable for the ordinary operations of Pharmacy?" Let this gentleman build a new laboratory, or be in need of some piece of steam apparatus adapted for a specific object, and then he will be better able to answer his own question. Without for a moment doubting one man's individual capacity, it is our duty as a corporate society to labour for the general good, remembering that the average in this world is made up of men of moderate abilities, and many of us (myself amongst the number) confess that we do fail and flounder most deplorably, and we should welcome with eagerness the help that might be afforded by an Industrial Museum. The voice continues thus:—"Are our engineers and published works of information grown so old-fashioned, that they cannot be consulted? and that therefore we must have an *expensive* centre of attraction, to which future aspirants to this particular branch of science may be borne?" I grant there are the engineers to be consulted; but I affirm that they are not likely suddenly to die off and become extinct in consequence of the foundation of an institution where their work may be better appreciated, and their practical skill find a fit arena for its exhibition. Steam has its fallacies. It is of vital importance to the pecuniary interest of the druggist that he should not be led away by his scientific predilections.

Steam is of unquestionable utility, and it is a true economy when there is sufficient work to justify its introduction, or where it is employed on the manufacture of one particular article. Steam is of questionable advantage where it has merely to meet the exgencies of an ordinary retail; it soon exhausts its work and is either lying idle, or, far worse, it is doing half its work. Whenever a boiler is supplying three pans out of six, because the rest are not required, steam is working at a disadvantage.* Never let this axiom be forgotten—machinery not in use is machinery getting out of order. In the case therefore of all, excepting very large establishments, we must turn our attention to those forms of apparatus which can be worked singly and so far economically. We cannot always use the open fire, but we may use gas. In spite of the improvements daily made around us, I believe the question of gas as applied to Pharmacy is as yet in its infancy. We want a scientific Soyer to enlighten us.

My own experience is that so much and no more convenient apparatus can be obtained than you are yourself able to design. I hope to see the day when gas and its applications will bring the resources of a laboratory within the range of the most mode-

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* I wish it to be distinctly understood that this notice of steam bears reference strictly to its financial and prudential relations with the peculiar business of a retail pharmaceutist. The great value of steam lies in its being a non-destructive source of heat. It is necessary, however, to caution too enthusiastic experimenters, that in order to work a laboratory satisfactorily, the product must bear due proportion to the producing power.

rate income; and when, by its aid, the conscientious pharmaceutist will be able, on the small scale, to work a still, evaporate extracts, dry vegetable substances, and have an adequate source of heat without the risk of large expenditure.

I hold, that on the grounds enumerated, we are justified in saying, that we want an established centre, where information could be readily obtained with regard to shop decorations, useful shop implements, chemical and laboratory apparatus, steam and gas.

Fortunately for us, the scheme proposed has no title to originality. There is already amongst us an Industrial Museum, of such unparalleled excellence, that it constitutes one of the attractions of London. It remains for us, with reverent footsteps, to follow in the beaten track.

Possibly nowhere in the world is there such another assemblage of the useful and the beautiful as at the South Kensington Museum. Its original conception, and the splendid liberalities of its subsequent arrangements, are living proofs that enthusiasm in art has not yet died away. Let us not fear, though we can never equal the affluence of its resources, to "go to the edge of our possibility," and do what we can.

Hereafter we may appear in Parliament with a bolder front, when it is found that we have not been ignobly resting on our oars, or been paralysed by recent failure; but, on the contrary, with renewed energy, we have taken a deeper and more practical interest in the welfare of our members, and are therefore the more entitled to legislative support.

I should deplore any such collection apart or distinct from an authorized scientific institution. Standing alone, it would lose importance, and it would be vain to hope that engineers and first-class men would contribute works of excellence to an unrecognized undertaking.

I think I know the very spot where it might stand, but I cannot entertain the thought, for our own Society does not sufficiently take the initiative in conserving and developing the trade interest of the community. It has rendered essential service, for it has made a chemist of the druggist; but it forgets that such of us as do not become professors, go home and keep a shop. Here I must end, leaving it for some abler person to second the following motion:—

"It is the opinion of this meeting that an Industrial Museum should be established, bearing the same relation to Pharmacy as that at South Kensington does to art."

The President said the paper just read was most suggestive, and he thought the resolution put by the author should not be allowed to pass unheeded.

Mr. Morson considered there were many inventions and applications in use throughout the trade not generally known, and which, if collected and placed in order, would constitute an interesting museum of pharmaceutical appliances. He further thought engineers of talent could devise and construct apparatus more suited to the dispensing trade than was in use, but members of the profession seemed content with such as they had at hand. He referred to the portable laboratories introduced some time ago, which proved a failure, for, though pretty to look at, they were found unserviceable.

Mr. Mercer formally seconded the resolution proposed by Mr. Ince, and spoke in praise of the author. He considered it a favourable sign of the progress of the age to have men of Mr. Ince's standing ready to give the benefit of their experience, though acquired often at great expense, to their brethren in the freest manner; it showed that the spirit of jealous reservation and secrecy which existed in former years was no longer tolerated, or at least was rapidly dying away.

The President proposed a cordial vote of thanks to Mr. Ince and likewise to Dr. Edwards, for their important communications. The vote was given by acclaim, and the meeting concluded.

The third general meeting was held on the evening of the 9th November, 1865; the President in the chair.

The following gentlemen were duly elected members, viz. Messrs. Dr. T. B. Partridge, Richd. Edwards, J. Hughes, and H. S. L. Gurney.

A donation of the 'Pharmaceutical Journal' for the month was announced, and the thanks of the meeting voted to the donors.

Mr. Mercer, the Vice-President, drew attention to the chemical toys known as "Parlour Wands." He mentioned that they were made in large quantities, with the object of being used as signals by the belligerents in the late American war. He stated that the brilliant light they produced on burning, as well as its colour, was due to the paper being impregnated with a metallic chlorate, which caused intense and rapid combustion of the carbon of the paper, and volatilized a portion of the metallic base at the same time, whence the coloured light.

The President next called upon Mr. Edw. Davies, F.C.S., to favour the meeting with his lecture "On Mercury and its Compounds."

Mr. Davies then delivered a very interesting lecture (which, however, did not extend beyond the consideration of the metal), and a short discussion followed, in which Mr. Mercer, the Secretary, Mr. Williams, and the President took part.

A vote of thanks, passed from the Chair to Mr. Davies for his instructive address, concluded the business of the evening.

The fourth general meeting was held on the evening of November 23, 1865; the President in the chair.

The following donations to the Library were announced, and the thanks of the meeting awarded to the donors:—The 'Chemist and Druggist,' and the 'Proceedings of the Pharmaceutical Conference at Birmingham.'

Dr. Edwards desired to direct the attention of the members, and of the chemists and druggists of the town, to the risk attached to the sale of articles in capsuled vessels other than those known as "Betts's Patent." He gave a detailed account of the nature of the alloy patented by Mr. Betts, and used in the manufacture of the capsules; he deprecated strongly the questionable way in which proceedings had been taken against many persons on the part of the patentee for selling capsuled articles, and quoted the legal opinion of Mr. Flux, the solicitor of the Pharmaceutical Society, on the subject. He thought it was advisable that the capsules should be discontinued, and the public notified that such articles as were heretofore sold in capsuled vessels would, in future, be offered without the capsules.

The President concurred in the propriety of the suggestion, and said he would act upon it.

Mr. John Abraham drew attention to the forthcoming issue of the 'British Pharmacopœia;' he referred to the course adopted by the Medical Council in bringing out the first edition, and considered it very desirable an alteration should be made in it in future, so that no "private and confidential" restriction should be imposed upon the members of the Medical Council and others such as would preclude the revision of the work by persons outside of the Council. He submitted the following resolutions, which were seconded by Dr. Edwards, and carried unanimously:—

"That the Council of the Pharmaceutical Society be requested to obtain proof sheets of the forthcoming issue of the new 'British Pharmacopœia' for examination, with a view to suggestions by a committee of this association, before the contents are sanctioned by the 'Medical Council.'

"That it be suggested to the Council of the Pharmaceutical Society that they recommend to the Medical Council that the new edition of the 'British Pharmacopœia' should not come into force until three months after its publication."

The lecture of the evening was delivered by the Vice-President, Mr. Mercer, F.C.S., "On Disinfectants in Relation to their Chemical Effects in Destroying Nuisances," etc. After the lecture, which was listened to with deep interest, the President and others offered a few remarks, and a hearty vote of thanks was passed to Mr. Mercer for his able and instructive lecture.

The fifth general meeting was held on the evening of December 7, 1865; the President in the chair.

Mr. H. F. Jackson was elected an Associate Member.

The following donations to the Library were announced, viz. the 'Pharmaceutical Journal' for December, and the 'Proceedings of the Birkenhead Literary and Scientific Society,' and the thanks of the meeting tendered to the donors.

The Secretary explained the nature of M'Dougall's Patent Disinfector, referred to in the speech of the Vice-President, and enlarged upon the nature of its action in destroying bad smells, etc.

Mr. C. Jones spoke of the disagreeable effects of the odour of carbolic acid, and gave it as his opinion that the disinfecting power of that body was very inferior.

The Secretary remarked that the antiseptic properties of carbolic acid could not be questioned, and he considered that this property indicated corresponding disinfectant qualities.

The President thought the subject an important one, and deserved investigation.

The lecture of the evening was "On the Compounds of Mercury," by Mr. Ed. Davies, F.C.S., who described the mode of manufaucture, properties, etc. of the principal pharmaceutical preparations of mercury, illustrating the subject by interesting and novel diagrams and experiments. A spirited discussion, sustained by several members, followed, and a vote of thanks passed to Mr. Davies for his very full and intelligent discourse, after which the meeting was adjourned to January 4, 1866, the President, in doing so, wishing the members a merry Christmas.

The sixth general meeting was held on the evening of January 4, 1866; Dr. J. B. Edwards, F.C.S., in the chair.

After the transaction of some general business, a discussion took place respecting the cause of the change of colour of iodide of mercury, and cognate effects, between the Secretary, Mr. Murphy, Mr. Davies, and the Chairman.

The Secretary read a note from the Secretary of the Pharmaceutical Society, relating to the resolutions adopted at a former general meeting of the Association.

Mr. Murphy laid before the meeting a sample of water from Harrogate, in which some abnormal components were lately discovered, and which rendered this water quite unique in its nature. The water was found to possess remarkable curative properties over many complaints, and it promised to prove a great boon to patients suffering from impaired digestion, loss of appetite, and the like. He gave a detailed tabulation of the analysis of the constituents of the water.

Dr. Edwards exhibited specimens of bricks made by mixing intimately caustic lime, sand, and cinders in the ground state, pressing the mixture in moulds, and drying in the air. Calcination was dispensed with in the manufacture, and the bricks were stated to possess high refractory and other properties, which rendered them superior to the ordinary article used for buildings, etc. A discussion on the general fitness and usefulness of the new bricks was sustained by Mr. Davies, Mr. Colby, the Chairman, and others.

The Chairman exhibited experiments showing the power of Becquerel's phosphorescent tubes to emit monochromatic light in the dark after being exposed to strong actinic light, and described the materials in them, and also gave a concise discourse on the properties of light of different qualities.

A vote of thanks to the Chairman concluded the business of the evening.

LEEDS CHEMISTS' ASSOCIATION.

The second meeting of the Session was held in the Library of the Philosophical Society, on the evening of November 8, 1865; the President, Mr. Haigh, in the chair.

Mr. Thomas Fairley, F.C.S., Lecturer on Chemistry at the Leeds School of Medicine, very kindly delivered to a large attendance of members and their friends, a lecture upon "The Phenomena of Combustion," which was illustrated by numerous experiments.

The third meeting of the Session was held on December 13; the President in the chair.

The following were elected Associates, viz.:—Messrs. Parker, Greenwood, Welham, Chambers, Meek, Thornley, Normanton, Willoughby, Prust, and Rossiter.

The Proceedings of the British Pharmaceutical Conference were presented from the Executive Committee.

Mr. Edward Brown read a paper upon "The Dispensing Chemist and his Remuneration." After explaining the limits within which he proposed to confine his remarks, Mr. Brown alluded to the large number of chemists who gave up their calling for other engagements,—the influences which led to this being often more lucrative prospects in connection with manufactures or commerce. When the chemist was thoroughly furnished with the multifarious information required in his own business, it was not wonderful if he found more tempting opportunities of applying this knowledge upon a larger scale than the retail counter could furnish. The close confinement of a shop was another and very different influence, which, by its injurious effects upon health, thinned our ranks and left us a smaller proportion of elderly men than in most other trades.

Mr. Brown then entered upon the main subject of his paper, which might be termed the ethics of prices. He expressed an opinion that the chemist who had achieved success in business, ought not to charge lower prices than he could have afforded when entirely dependent upon his sales for making a livelihood. Exceptions to this duty of maintaining prices were admissible towards the really poor class of customers; and since, in some districts, all the clients of a chemist belonged to this class, he would be exempt from the rule. Again, on the other hand, in some districts, where wealth and luxury prevailed, greater accommodation and attention would be required by customers, who might be charged proportionately higher. The author brought forward many reasons why sound morality claimed such a rule as he had laid down in his paper: let competition be in quality and in the style in which business was done, not in trying to undersell a neighbour. The paper concluded by a consideration of the desirability of a fixed price current to be observed by all chemists in the towns where it was adopted. The author was disposed to think favourably of such a compact as this implied, and brought forward the case of the price list that has been for several years used by the chemists of Edinburgh. This tariff includes both retail sales and dispensing; in the latter case, the chemist who first dispenses a prescription marks it with the standard price in a cipher known to all the trade. This ensures uniformity in future charges. In conclusion, Mr. Brown read a letter which he had received from Mr. Ainslie, of Edinburgh, giving a report of the working of the list alluded to:—

"Mr. Edward Brown,

"Dear Sir,—I have much pleasure in replying to your note of the 4th instant, regarding the working our retail price list. We have a retail price committee, say of twelve gentlemen, and a convener. We meet *generally* twice a year to make any alterations required; but if any article advances very much, and rapidly, our convener calls us together to fix what our price is to be, but as a rule we do not alter our prices for a trifling variation. I believe our list price is adhered to by all whom we call the respectable members of the trade.

"But I must state the feeling of the trade, as a whole, to be that this list is a great comfort, and not only a comfort, but a considerable *pecuniary advantage*. I have long been of opinion that chemists, especially *dispensing chemists*, have not been remunerated for their labour and responsibility; and this movement of ours, although not all that one could wish, is decidedly a move in the right direction. Being a member of this price committee, I was present at a meeting fourteen days ago; we made several minor alterations, to take effect on January 1st, 1866. Amongst the more important, I may mention *tinctures*; that is, those previously charged 5*d.* oz., or such as tr. gent. co., sp. am. arom., etc., are to be in future 6*d.* oz.; cod-liver oil, the same price as castor oil, in our list, 8 oz. and bottle, 1*s.*, although the prices *generally exclude* bottles. If I can give you further information, it will afford me pleasure, as I think it is our duty as brethren to assist each other in the advancement of our trade interests.

"I am, dear Sir, yours respectfully,

"Wm. Ainslie."

A lively discussion followed the paper, in which many members took part; and the general feeling was favourable towards a consideration of the subject of a price list.

Mr. Reynolds, F.C.S., exhibited a series of sixty models of fungi, which he had lately received from the Continent. He took the opportunity also of rapidly reviewing a number of species belonging to this Natural Order, having an interest to mankind either from useful qualities or their destructive influences upon animal or vegetable life.

Mr. Ward moved, and Mr. Thompson seconded, a vote of thanks to the authors of papers.

The fourth meeting was held on January 4, 1866; the President in the chair.

Mr. George Ward, F.C.S., gave a very lucid and interesting lecture upon "Specific Gravities," which was illustrated by apparatus and demonstrations.

The best thanks of the meeting were offered to Mr. Ward.

ORIGINAL AND EXTRACTED ARTICLES.

PANCREATINE.

This remedy was first brought to the notice of medical men by Dr. G. Harley, who, in 1858, read a paper before the British Association for the advancement of medical science, entitled "Notes of Experiments on Digestion," in which the author speaks of the pancreatic secretion as the most curious of the digestive fluids, uniting in itself the properties of all the others. Subsequently, the subject was taken up by Dr. Horace Dobell, who, in a communication to the 'Lancet' of September 10, 1864, "On the Assimilation of Fat in Consumption," gave a summary of thirty-three cases of consumption treated with pancreatic emulsion of beef fat. This emulsion of beef fat was afterwards replaced by emulsion of lard-oil in similar cases. In the 'Lancet' of November 11, and November 18, 1865, the treatment of a number of cases with the pancreatic emulsion of lard-oil, as well as the emulsion with suet, is described by Dr. Dobell as highly satisfactory. The substance to which, in these communications, the name *pancreatine* is applied, is an oil-like substance obtained from the pancreas (sweet-bread) of recently killed animals. This substance, or the pancreatic secretion containing it, is represented by some writers on physiological chemistry as capable of transforming starch and other bodies into grape sugar,of generally promoting the digestion of food, and especially of forming a permanent emulsion with fatty substances as a preliminary step to their assimilation. It is somewhat doubtful to what extent it is entitled to all these characters, but it certainly does to a remarkable degree possess the property of causing the admixture of fats with water so as to form permanent emulsions. It is in the form of emulsion that pancreatine is generally administered; but if the object of its administration be to promote the assimilation of the fatty constituents of food, such effect would no doubt be more efficiently produced by administering the pancreatine alone, or dissolved in spirit, which is a good solvent of it. The pancreatine is free from any disagreeable taste or smell.

THE SACCHARIDE OF COD-LIVER OIL.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—In your last number is a letter from Dr. Le Thière, in which, under cover of a desire to relieve agents in France and England from all responsibility connected with the sale of the "saccharated cod-liver oil powder," he attempts to justify the statement that the powder contains the elements of cod-liver oil. He does this in the following sentence:—"My formula is entered in the Register of the Pharmacy of Messrs. Roberts and Co., and these gentlemen can state whether my saccharide, of which sugar of milk is only the vehicle, does not contain sulphur, iodine in the form of iodide of potassium, bromine, and hypophosphite of lime." You will observe that Dr. Le Thière does not say that the powder *does* contain these ingredients,—(a leading medical journal and some other weekly papers misquoted the letter in this respect,)—he simply says that Messrs. Roberts and Co. can speak on this point. But let that pass, and let it be taken for granted that Dr. Le Thière desires us to believe that the powder is composed of the said substances. What, then, let me ask, is to be understood by the account of the composition of the powder given in the little "treatise" that accompanies the boxes sold in England? At page 6 of that pamphlet we read:—"This saccharine powder is formed by incorporating cod-liver oil with an absorbing and conservative substance, by which means the elements of the oil (iodine, chlorine, bromine, phosphorus, sulphur, etc.) are completely assimilated. . . . A long and methodical trituration preserves all its virtues, and gradually developes its medical properties."

The only conclusion to be drawn from Dr. Le Thière's letter is an admission on his part that the powder paraded before the public as a mixture of cod-liver oil and sugar contains no cod-liver oil at all. In the sentence just quoted from the "treatise" the elements iodine, bromine, etc. are mentioned, not in a general sense, but as constituent parts of the oil; Dr. Le Thière admits, in effect, that the oil is absent, therefore he admits that the constituent parts of the oil are absent too. This was just the conclusion I came to in my analysis of the powder published in the December number of your Journal.

Here I might let this matter rest, content with such an unexpected confirmation of the truth of my analysis; but my duty as an analyst, holding a public appointment, forbids me to do so.

Dr. Le Thière seeks to retreat from an untenable position by suggesting that the powder contains in a *general* sense the elements of cod-liver oil,—iodine in the form of iodide of potassium, phosphorus as hypophosphite of lime, etc. Now these substances are common medicines, whose doses are well known; we should therefore expect to find a reasonable amount of them in the stated dose (half a teaspoonful) of the powder. But on dissolving even eight or ten times that quantity in water, and applying the starch test, or the nitrate of silver test for iodine, no reaction was obtained from the contents of either of the boxes I examined. Nor, on burning a similar amount, was a weighable quantity of ash obtained, which would have been the case had the specimens contained iodide of potassium, bromide of potassium, or hypophosphite of lime. Other experiments showed the absence of free or combined sulphur or phosphorus.

What now will medical men, chemists and druggists, patent-medicine dealers. and the public generally say to "Dr. Le Thière's Saccharated Cod-Liver Oil Powder"? The "treatise" said it was cod-liver oil and sugar; I said there was no oil in it: Dr. Le Thière admits, in effect, that the treatise was wrong and I right. Dr. Le Thière now says that the powder is a mixture of milk-sugar and the above well-known metallic salts. I say that chemical tests performed on specimens obtained from commercial houses in Paris and London still show that it is milk-sugar only.

With regard to the first part of Dr. Le Thière's letter, I may shortly say that it was quite unnecessary to ask me to relieve Messrs. Roberts and Co. and Messrs. Wilcox and Co. from responsibility, inasmuch as I imputed none to them. I simply copied and published in my paper the label on the box of powder obtained from Paris. They themselves incurred any responsibility that may be connected with the matter by allowing their names to be so used. On the boxes sold in England I find other names which, now that Dr. Le Thière has admitted the proprietorship of the powder, need not be mentioned. No imputation of any kind was or is cast on any mere dealer in the powder.

I am, Gentlemen, yours faithfully,

17, Bloomsbury Square. JOHN ATTFIELD.

BIRMINGHAM CHEMISTS' ASSOCIATION.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The short notice contained in last month's Journal, of the unsuccessful attempt to organize a Chemists' Association in Birmingham, has, I am informed, been misconstrued by some persons, who have concluded that there is little prospect of successful organization amongst chemists in provincial towns, if in such places as Birmingham they have failed in the attempt to do so. This idea will be corrected by the explanation that the effort made here was entirely novel in its character, and that our views only partially embraced the usual objects of Pharmaceutical bodies. They comprised commercial, social, as well as scientific objects, and the success of the association so to be formed was made dependent upon a wide-spread support and pecuniary aid. The prospect of support which our canvass developed was not sufficient to induce us to proceed with the proposal in that form. And though we are discouraged in any further attempt to organize the Chemists of the neighbourhood at present, we should sincerely regret that our want of success should discourage our brethren elsewhere in the promotion of associations more purely Pharmaceutical.

Yours respectfully,

Birmingham, November 26, 1865. GEORGE DYMOND.

ENGLISH PHARMACEUTICAL WEIGHTS AND MEASURES FROM A FRENCH POINT OF VIEW.

Professor Guibourt, the learned Secretary of the Superior School of Pharmacy of Paris, has presented to the notice of pharmaceutists some observations on the medicinal weights of Europe as compared with metrical weights, these observations forming the substance of a discourse, inaugurating the session of 1865–6. The Professor devotes a considerable space to a revision of the systems prevalent in this country, and points out their anomalies and inconsistencies with no little acumen. As the entire address is too lengthy to transfer to our pages, we subjoin a few extracts which we think interesting and instructive.

After a review of the weights and measures which figured in the earlier pharmacopœias of this country, the author observes:

> From what precedes, we find that from the year 1826 to the year 1836, there existed in England three systems of weights, to which chemists added the wine-pint or *octarius*, these four systems giving rise to

an ounce avoirdupois	weighing	28·35	grammes.
an ounce troy	„	31·10	„
a fluid ounce	„	29·57	„
a dram avoirdupois	„	1·77	„
an apothecary's dram . . .	„	3·89	„
a fluid dram	„	3·70	„

> Has this confusion been remedied? By no means. In 1836 the College of Physicians of London having brought out a new pharmacopœia, an Order in Council of William IV. notifies to all Apothecaries and others whose business it is to compound medicines, that they may only do so after the manner prescribed in the said work and conformably to the weights and measures therein appointed.
>
> In this work, the weights adopted are those called *Apothecaries'*; as to measures, the College substituted for the gallon and wine-pint previously used, the imperial gallon and imperial pint prescribed by the Act of George IV. But as this pint contained $\frac{5}{4}$ths of an avoirdupois pound, instead of dividing it into 16 ounces, as the wine-pint and the pound avoirdupois, they divided it into 20 ounces, so as to render the fluid ounce equal to the ounce avoirdupois. The final result of this modification was to substitute for a fluid ounce of 29·57 grammes, one of 28·37 grammes; for a fluid dram of 3·70 grammes, one of 3·54 grammes, and so forth. But the

foundation of this confusion, as mentioned in the *Pharmacopœia Reformata* of 1744 and in Dr. Christison's Dispensatory of 1848,—that is to say, the two systems of pounds and ounces,—still remained.

What should have been done, it will be asked, to suppress these sources of error? We answer, either to have taken the avoirdupois pound as originally established, with its subdivisions of 16 ounces, 128 drams, 384 scruples, and 9216 grains, and to have regulated both weights and measures by this scale,—or, as we think would have been preferable, to have resolutely abolished the avoirdupois weights, and to have demanded for Great Britain either a single pound of 12 ounces troy, or a single pound of 16 ounces troy. There would then have been for all but one pound, one dram, one grain; and the pound-measure divided as the pound-weight, would not given rise to the use in the same shop of two ounces, two drams, etc., of different values.

Instead of this, what have the authors of the British Pharmacopœia of 1864 done? They have, in the first place, admitted the impossibility of any alteration of the imperial pint and its subdivisions, as laid down by the Order in Council of 1836:—and then they have adopted as the medicinal pound, the avoirdupois pound of 7000 grains troy. But not being able to divide this pound into ounces, drams, and scruples, containing exact numbers of grains, they have wished to be able to suppress the three intermediate denominations and to set up a ponderal system composed only of a pound and grains. But recoiling doubtless before the practical impossibility of such an attempt, they have admitted an ounce of 437·5 grains. They have however suppressed in their scale of weights (though not in that of measures), the dram and the scruple, for a reason which ought to have caused the disappearance of the ounce likewise,—that is, because it is impossible for these unities to be at once exact multiples of the grain and integral parts of the pound. Even with this forced acceptation of the ounce, we find in the British Pharmacopœia such formulæ as these:

Page 256. *Infusion of Linseed.*

Take of

Linseed	160 grains.
Fresh Liquorice Root	60 ,,
Boiling Distilled Water . . .	10 fluid ounces.

Page 291. *Mucilage of Tragacanth.*

Take of

Tragacanth	100 grains.
Boiling Distilled Water . . .	10 fluid ounces.

Page 260. *Compound Tincture of Lavender.*

Take of

Oil of Lavender	$1\frac{1}{2}$ fluid drams.
,, Rosemary	10 minims.
Cinnamon	150 grains.
Nutmeg	150 ,,
Red Sandal-wood	300 ,,
Rectified Spirit	2 pints.

Page 237. *Citrate of Iron and Quinia.*

Take of

Solution of Persulphate of Iron .	3 fluid ounces.
Sulphate of Iron	1 ounce.
Solution of Soda	36 fluid ounces.
Citric Acid	$2\frac{1}{4}$ ounces.
Sulphate of Quinia	380 grains, etc. etc.

Attempt now, to weigh 160 grains of Linseed, 60 grains of Liquorice, 100 grains of Tragacanth, 160 grains of Cinnamon, 300 grains of Red Sandal-wood, and 380 grains of Sulphate of Quinine, without using weights which are multiples of the grain ;—and if in doing so it is not only convenient but even necessary to employ such multiples, why should they have suppressed the names of *dram* and *scruple*, because they have adopted a pound which does not comport with these weights?

At page 255 is the following formula for

Compound Infusion of Gentian.

Take of

Gentian	$\frac{1}{4}$ ounce.
Bitter-orange Peel	30 grains.
Corianders	30 „
Proof Spirit	2 fluid ounces.
Distilled Water	8 „

Here you order 30 grains troy of orange peel and as much of corianders ; in spite of your abolition of troy weight, the chemist will use his old half-dram which represents exactly the required amount; and next you order a quarter of an ounce which is equal to 109·375 grains, to obtain which a special weight has to be constructed to square with your avoirdupois pound!

* * * * * * * * * * * *

I cannot quit this subject without expressing my disapproval of the use of *measures* which are ordered to be used for all liquids, mercury excepted, and for which the authors of the British Pharmacopœia manifest a strong predilection. In my opinion no instrument is comparable to a balance for determining exactly the quantity of a liquid, and I highly approve the directions of the later Prussian pharmacopœias in not allowing the measuring of liquids. The Bavarian Pharmacopœia is also to be commended in only permitting the measurement of liquids in the case of those which are of but slight medicinal activity. * * * * *

PHARMACEUTICAL NOMENCLATURE.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—So much has been lately written on the nomenclature of the Pharmacopœia, that I fear my remarks will be lost in the crowd, if admitted, and go for nothing ; but it does not signify,—here they are.

I object strongly to the absurd name "pilula," alike for a lump capable of being formed into a thousand "pilulæ," and for the pill or "pilule" itself. It is time it was discontinued. Why should not "massa" do, already so frequently adopted by the profession ?

When we get to the very "essence" of a thing, it is generally understood that we can go no further in that direction. Such a name, Latinized, would be far better, and more expressive, than "oleum," for the so-called "essential oils," and would sound more English than Mr. Piesse's "otto." Or, employing that term as suggested, it would be an infinitely preferable substitute for "liquor," "infusum, decoctum, or tinctura concentrata," for such preparations as are supposed to contain all the properties worth preserving of any particular drug in the most available form, when the qualities of keeping, smallness of dose, and convenience of administration are taken into view.

I see no objection to, but great advantage in, the re-adoption of the old word "calomelas" for a preparation which could not, thus distinguished, possibly be mistaken for any other. The oft-repeated objection, viz. the occasional need of disguise, has no force, for surely any medical man can, when he sees fit, substitute a term expressive of its composition, as easily as he could for "alumen" or "creta." In every case, where there is one, I would give at least one authorized synonym, whether scientific or otherwise, so that it be not liable to mislead. I would not sanction "saccharum plumbi" as equivalent to plumbi acetas.

Although faulty in derivation, I think some such term as "chloro-mercurius" would settle a long-vexed question, and leave little to be desired, for "hydrargyrum corrosivum sublimatum." I do not think it comes necessarily within the province of a pharmacopœia to teach chemistry, to decide between rival theories, or to be in advance of the age.

If "emplastrum" be retained to signify a spread plaster ready for immediate use, I certainly would coin a word "plastum," "plastrum," or (already in vogue) "plasma," for an article yet more unlike an "emplastrum," so understood, than "pilula" (massa) is to a pill.

Let "linimentum" always signify a preparation to be rubbed on or into, to bear, if needful, the caution "not to be swallowed."

I would cashier "vina" altogether, making it in some cases optional to employ a wine, provided a preservative proportion of alcohol be added, then to be called "vinum," but giving no formulæ. The main business of a pharmacopœia being, as I conceive, to consolidate and give permanence to some portion of the perpetually moving and sometimes shifting and unstable mass of science of the time, it can but select,—rarely invent,—and should never interfere in the proper province of the cook, confectioner, or sick-nurse, beyond supplying them, where their practice trenches on pharmacy, with definite standards for strength and efficiency. I quite agree with those gentlemen who advocate a standard form for medicines in popular demand, against which no other objection can be brought than that they are not perhaps the most elegant, or absolutely required, such as syr. rhei, syr. croci, syr. violæ, ess. zingib., etc., and I would even add formulæ for avowed substitutes for chlorodyne, black draught, Godfrey's cordial, and a mist. pectoralis.

"Bucco," "cusso," "chlorum," "iodum," "quinia," "aconitia," are changes purely for change' sake, and for the worse, possessing not one tittle of advantage, not even that of euphony. Pray let us have the old names back again, and the text of new P. B. in Latin, says—

Yours respectfully,

THOS. LOWE.

20, *Ranelagh Street, Liverpool,*
December 12*th*, 1865.

WHAT SHOULD A PHARMACOPŒIA CONTAIN?

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—After carefully reading "Country Druggist's" letter in your last Journal, I cannot pass it by without answering it and giving my own view of the P. B. in reference to his remarks. I quite agree with him that in its present form "it is neither one thing nor the other," but I think it would be an utter impossibility to give in any pharmacopœia forms for all the preparations a druggist is obliged to keep, as many of them which we have in constant use are from private formulæ, such as—pulv. Jacob. ver., liq. bismuthi (Schacht), chlorodyne (C. Brown), nepenthe (Ferris and Co.), liq. opii sed. (Battley), and numerous others; also the syrups of iron and quinine combined with the phosphates, which are not proprietary, but would be quite out of place in an officinal list, although they are in constant use in large dispensing establishments. Of the omissions he complains of tr. quassiæ, an Edinburgh preparation, of which I think I may say it is almost quite obsolete, and rarely if ever prescribed, the infusion having taken its place; tinct. rhei, also P. E., for the same reason is omitted, and the more useful tr. rhei co., being an amalgamation of the L. and D., substituted; tinct. guaiaci, not often prescribed, the ammoniated tincture having quite superseded it; tinct. iodi certainly was very useful as a pigment, and would have been better if it had been included; as to syr. croci, he says, "you find it oftener in prescriptions than any other syrup, except syr. aurantii."

I have had experience in several good establishments as dispenser, and I find it rarely ordered, (syr. aurant. mori, and rhœados being the favourite syrups,) and having but slight medicinal properties, we can well afford to lose it. I agree with him in his remaining remarks, and hope to see in the future Pharmacopœia, revised and corrected, a *vade mecum* for the prescriber, dispenser, laborator, and apprentice. Apologizing for intruding upon your valuable space,

I am, etc.,

A DISPENSER.

Clifton, December 18, 1865.

OINTMENTS AND THEIR SUBSTITUTES.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—It is of course beyond the province of a chemist and druggist to express an opinion that aqueous dressings are, in most instances, preferable to unguents, or *vice versâ*, but it is our business to see that what is ordered by the physician, and asked for by the public, is in the best state to answer the purpose intended, and there can be no doubt that (excepting, perhaps, Ung. Sulphuris) all ointments are more fitted for use when freshly made or sent out in their normal state, than after being long kept. Having paid a good deal of attention to this branch of Pharmacy, I submit the result of my experience, knowing well that these matters of every-day business are always conned by your readers with more or less interest.

First, with reference to olive oil,—I would expunge this oil from the Pharmacopœia, substituting almond oil for it. Olive oil is very variable in quality, and always contains more or less mucilage. Whether this ensues from pressing bad olives, or from adulteration with seed oil, it is not easy to say, but our law courts have lately proved that the latter is sometimes made available. A very good test for the quality of this oil is supplied in making linimentum ammoniæ—the more inferior the oil the thicker will be the emulsion,—in fact, I find of late it is impossible to use the olive oil, now met with in commerce, for this purpose, the product averaging the consistence of Devonshire cream. I am not sure that even almond oil is exactly what it ought to be. The late Mr. Hallows read a paper at one of the earlier meetings of the Society, recommending this liniment to be made with a mixture of nut oil and almond oil; it certainly now, without the addition, gives an emulsion with very little separation.

Secondly, with reference to lard,—I think this substance, from its proneness to rancidity, might be omitted in some cases with advantage in some of the cases in which it is ordered. There is also this drawback; very few possess the appliances for *rendering* it properly, and must necessarily depend upon the wholesale houses for its preparation. *Ceratum simplex* of the P. L., from its hardness, was practically useless. The unguentum simplex of the P. B. might be supplanted by an ointment which, under the name of ceratum molle, forms a most excellent simple dressing, also a good vehicle for more potent remedies. I formerly prepared it with olive oil, but latterly with almond oil. Its composition is—

℞ Ceræ Flavæ ℥ij
Ol. Amygd. ʒix. M. ft. Ung.

Ung. hyd. nit. mit. prepared with the ceratum molle maintains its respectability long after the other has been condemned.

Ung. sabinæ I do not make, but I believe, if the savine were digested with almond oil and after straining solidified with yellow wax we should have a more permanent colour than is now obtained.

Ung. pot. iod. is the most unstable of all. Unless it can be proved that hog's-lard has some occult power of assimilating iodide of potassium with the living organism, its abolition in favour of a solution in linimentum saponis or glycerine would give more satisfaction to the patient, and prevent many angry expressions of the dispenser.

The suggestion of Mr. Groves, at the Bath Conference, to add oil of pimento as a preservative, I look upon as an interesting chemical fact, but hardly think it would take with the public. Many will recollect the time (those were not the days of the Pharmaceutical Society) when it was a common practice to assist in the transmutation of lard into spermaceti ointment, a little essential oil being added "just to cover the fatty smell," and the frequent request of the customer that it was "not to be scented."

The concluding observations of Mr. Groves chime in so well with my own ideas that I take the liberty of quoting them as a sequel to my own remarks:—"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 same 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."

Yours obediently,
THOS. A. BARBER.

Islington, January 16, 1866.

IMPORTANCE OF A KNOWLEDGE OF TOXICOLOGY TO THE PHARMACEUTICAL CHEMIST.

At a meeting of the Wilsonian Association, held at 5, St. Andrew Square, Edinburgh, on the 5th of December, R. Carter Moffatt, F.R.S.S.A., President, in the chair, the President, after some preliminary observations, proceeded to give his address on "The Importance of Pharmaceutical Chemists keeping in Stock, ready for use, the Antidotes for the Common Poisons." His remarks on this most important subject excited much attention, and seemed to command the earnest consideration of the profession. Allusion was made to the practice of some eminent Pharmaceutical Chemists declining to exert themselves to try and save the lives of persons who had been poisoned, or any way injured, either by design or mistake. They would send for a medical man, but, if none could be obtained, allow the poor creature to perish. Such conduct he (the President) characterized as unmanly and selfish in the extreme. The medical profession would not, he was certain, entertain for an instant the idea that it was not the province of the Pharmaceutical Chemist to do all he knew in such an emergency, and where time was so valuable. Diagrams were suspended containing the various classes of poisons and their antidotes, together with the number of deaths from particular poisons in different countries. The address was also illustrated by numerous experiments, showing the modes of chemical combination of certain antidotes. There was a large attendance. A hearty vote of thanks to the President concluded the public business of the meeting.

COFFEE.

BY BARON LIEBIG.

When a boy I had lessons in French of a Frenchwoman, whose husband was confectioner in the grand-ducal kitchen at Darmstadt. One of the sons—he became afterwards a brave and distinguished officer—was a great crony of mine, and with him I often paid a visit to the said ducal kitchen, which for me was not merely a source of material enjoyment.

The steaming, roasting, and boiling which were going on there excited in me the greatest interest, and I could uninterruptedly watch the process of roasting a joint from the first when it was put raw on the spit, till the consummating moment when the fire had imparted to it a rich brown covering and of sweetest savour.

I observed how the roast veal was sprinkled with salt, the capons wrapped in slices of bacon; nothing escaped my eager boyish attention.

Hence I have retained a taste for cooking, and in leisure hours occupy myself with the mysteries of the kitchen; with the preparation of articles of human food, and all thereto belonging; in which are not unfrequently included matters of which chemistry knows next to nothing.

Young chemists do not devote their attention to such things, inasmuch as they are little fitted to afford proof of their skill and ingenuity, or to found a claim to recognition in the domain of science. It therefore is left for the older ones to do so.

On the best method of preparing our common beverage, coffee, the opinions both of cooks and connoisseurs considerably diverge; and the difficulty of a decision can fail to be appreciated by him who knows that our tinmen and other artificers are yearly adding to the improvement of the half-hundred biggins or coffee-pots which we already possess.

As my recipe for the preparation of coffee threatens to make all these inventions unnecessary, I risk, of course, making all manufacturers, as such, my adversaries.

I appeal, however, to the impartiality of those who drink my coffee, all of whom I hope to have on my side.

So much has already been written about the mental influence of tea and coffee upon our modern society and civilization, that it is useless to dwell on it more particularly here.

But this is certain, that Anne Boleyn must have risen from a breakfast of half a pound of bacon and a quart of beer (mentioned by her in one of her letters) with very different sensations as well as sentiments from those she would have had, if the meal had consisted only of a cup of coffee or tea with some bread-and-butter and an egg.

I also pass over unnoticed the national economical importance of coffee, and will merely say a few words on the influence which coffee has had on modern warfare.

In the first Schleswig-Holstein and the last Italian campaign the introduction of coffee very materially contributed to improve the general health of the German and French soldier; and I am assured (by Captain Pfeufer, of the Sanitary Commission in the Bavarian army) that since the use of coffee in the Bavarian army as beverage for the men, the numbers of soldiers on a march unable to proceed has, in comparison with formerly, very considerably diminished,—so much so, indeed, that sometimes not a man is ill; and this, too, when the distances have been great and the weather unfavourable.

And Julius Froebel relates (‘Seven Years in Central America,’ p. 226), that for the men accompanying the great trading caravans in Central America, coffee is an indispensable necessity:—“Brandy is only taken as a medicine, but coffee, on the contrary, is an indispensable article, and is drunk twice a day, and in large quantities. The refreshing and strengthening effect of the drink under great toil, in heat and in cold, in rain or dry, is extraordinary.”

As is well known, the English are masters in the preparation of tea. In preparing coffee, the Germans are, so they assert, greater adepts. It is certain that more coffee is drunk in Germany than tea.

The German *savant* especially prefers coffee to tea, which, perhaps, is because of his habits, and of the different effect of the two beverages on the body.

Tea acts directly on the stomach, whose movements sometimes can be so much augmented by it, that strong tea, if taken fasting, inclines to vomiting.

Coffee, on the contrary, furthers the peristaltic movement downwards; and, therefore, the German man of letters, more accustomed to a sitting life, looks on a cup of coffee, without milk and assisted by a cigar, as a very acceptable means of assisting certain organic processes.

For the same reason, so it is said, Russian ladies have become patronesses of coffee and tobacco.

These remarks prove sufficiently that the preparation of a beverage possessing in the highest degree the above valuable qualities, cannot be without interest.

I was originally led to my attempts in this matter by the intention to obtain an extract of coffee, which might be useful for travellers and for armies on a march; and on this occasion I became aware of the influence which the atmosphere, or the oxygen in atmosphere, exercises on coffee, by which its qualities are very materially deteriorated. I have found that a watery hot extract of roasted coffee, which, when fresh, is perfectly enjoyable—if allowed to evaporate, quickly or slowly, in a high or low temperature, loses by degrees its agreeable flavour from coming in contact with the air; a black mass remains that cannot be entirely redissolved in cold water, and which on account of its bad taste cannot be used.

Be the method of preparing coffee what it may, it is first requisite to sort the berries. Foreign substances are frequently found among them, bits of wood, feathers, and usually a number of black mouldy berries, which must be taken away; for our sense of taste is so delicate that the smallest admixture cannot escape notice.

Berries of dark or green hue are generally dyed; and these must first be washed in a little water and afterwards dried with a warm linen cloth; with those of a pale colour this is unnecessary.

The next operation is the *roasting*. On this depends the good quality of the coffee. In reality the berries should only be roasted until they have lost their horny condition, so that they may be ground, or, as is done in the East, pounded to a fine powder.

Coffee contains a crystalline substance, named *caffeine*, or *theine*, because it is also a component part of tea.

This matter is volatile, and every care must be taken to retain it in the coffee. For this purpose the berries should be roasted till they are of a pale brown colour; in those which are too dark there is no caffeine; if they are black, the essential parts of the berries are entirely destroyed, and the beverage prepared from these does not deserve the name of coffee.

The berries of coffee, once roasted, lose every hour somewhat of their aroma, in consequence of the influence of the oxygen of the air, which, owing to the porosity of the roasted berries, can easily penetrate.

This pernicious change may best be avoided by strewing over the berries, when the roasting is completed, and while the vessel in which it has been done is still hot, some powdered white or brown sugar (half an ounce to one pound of coffee is sufficient). The sugar melts immediately, and by well shaking or turning the roaster quickly, it spreads over all the berries, and gives each one a fine glaze, impervious to the atmosphere. They have then a shining appearance, as though covered with a varnish, and they in consequence lose their smell entirely, which, however, returns in a high degree as soon as they are ground.

After this operation, they are to be shaken out rapidly from the roaster and spread out on a cold plate of iron, so that they may cool as soon as possible. If the hot berries are allowed to remain heaped together, they begin to sweat, and when the quantity is large the heating process, by the influence of air, increases to such a degree that at last they take fire spontaneously. The roasted and glazed berries should be kept in a dry place, because the covering of sugar attracts moisture.

If the raw berries are boiled in water, from 23 to 24 per cent. of soluble matter is extracted. On being roasted till they assume a pale chestnut colour, they lose 15 to 16 per cent., and the extract obtained from these by means of boiling water is 20 to 21 per cent. of the weight of the unroasted berries. The loss in weight of the extract is much larger when the roasting process is carried on till the colour of the berries is dark brown or black. At the same time that the berries lose in weight by roasting they gain in volume by swelling; 100 volumes of green berries give, after roasting, a volume 150 to 160; or two pint-measures of unroasted berries give three pints when roasted.

The usual methods of preparing coffee are, 1st, by *filtration;* 2nd, by *infusion;* 3rd, *boiling.*

Filtration gives often, but not always, a good cup of coffee. When the pouring the boiling water over the ground coffee is done slowly, the drops in passing come in contact with too much air, whose oxygen works a change in the aromatic particles and often destroys them entirely. The extraction, moreover, is incomplete. Instead of 20 to 21 per cent., the water dissolves only 11 to 15 per cent., and 7 to 10 per cent. is lost.

Infusion is accomplished by making the water boil, and then putting in the ground coffee; the vessel being immediately taken off the fire and allowed to stand quietly for about ten minutes. The coffee is ready for use when the powder swimming on the surface falls to the bottom on slightly stirring it. This method gives a very aromatic coffee, but one containing little extract.

Boiling, as is the custom in the East, yields excellent coffee. The powder is put on the fire in cold water, which is allowed merely to boil up a few seconds. The fine particles of coffee are drunk with the beverage. If boiled long, the aromatic parts are volatilized, and the coffee is then rich in extract, but poor in aroma.

As the best method, I adopt the following, which is a union of the 2nd and the 3rd:—

The usual quantities both of coffee and water are to be retained; a tin measure containing half an ounce of green berries, when filled with roasted ones, is generally sufficient for two small cups of coffee of moderate strength, or one, so-called, large breakfast cup (one pound of green berries, equal to 16 ounces, yielding after roasting 24 tin measures [of $\frac{1}{2}$ ounce] for 48 small cups of coffee).

With three-fourths of the coffee to be employed, after being ground, the water is made to boil for ten or fifteen minutes. The one quarter of the coffee which has been kept back is then flung in, and the vessel immediately withdrawn from the fire, covered over, and allowed to stand for five or six minutes. In order that the powder on the surface may fall to the bottom, it is stirred round; the deposit takes place, and the coffee poured off is ready for use. In order to separate the dregs more completely, the coffee may be passed through a clean cloth; but generally this is not necessary, and often prejudicial to the pure flavour of the beverage.

The first boiling gives the strength, the second addition the flavour. The water does not dissolve of the aromatic substances more than the fourth part contained in the roasted coffee.

The beverage, when ready, ought to be of a brown-black colour; untransparent it always is, somewhat like chocolate thinned with water; and this want of clearness in coffee so prepared does not come from the fine grounds, but from a peculiar fat resembling butter, about 12 per cent. of which the berries contain, and which, if over-roasted, is partly destroyed.

In the other methods of making coffee, more than the half of the valuable parts of the berries remains in the "grounds," and is lost.

To judge as favourably of my coffee as I do myself, its taste is not to be compared with that of the ordinary beverage, but rather the good effects might be taken into consideration which my coffee has on the organism. Many persons, too, who connect the idea of strength or concentration with a dark or black colour, fancy my coffee to be thin and weak, but these were at once inclined more favourably directly I gave it a dark colour by means of burnt sugar, or by adding some substitute.

The real flavour of coffee is so little known to most persons that many who drank my coffee for the first time doubted of its goodness, because it tasted of the berries. A coffee, however, which has not the flavour of the berry is no coffee, but an artificial beverage, for which many other things may be substituted at pleasure. Hence it comes that if to the decoction made from roasted chicory, carrots, or beetroot, the slightest quantity of coffee be added, few persons detect the difference. This accounts for the great diffusion of each such substitute. A dark mixture, with an empyreumatical taste, most people fancy to be coffee. For tea there are no substitutes, because everybody knows what real tea is like.

Heating qualities have generally been attributed to coffee, and for this reason it is avoided by many people: however, these heating qualities belong to the volatile products called forth by the destruction of the soluble parts of the berries in the process of roasting. Coffee prepared in my manner is not heating, and I have found that it may be taken after dinner without disturbing the digestion; a circumstance which, with me at least, always takes place after the enjoyment of strongly roasted coffee.

For special cases, such as journeys and marches, where it is impossible to be burdened with the necessary machines for roasting and grinding, coffee may be carried in a powdered form, and its aromatic properties preserved by the following process:—One pound of the roasted berries are reduced to powder, and immediately wetted with a syrup of sugar, obtained by pouring on three ounces of sugar two ounces of water, and letting them stand a few minutes. When the powder is thoroughly wetted with the syrup, two ounces of finely-powdered sugar are to be added, mixed well with it, and the whole is then to be spread out in the air to dry. The sugar locks up the volatile parts of the coffee, so that when it is dry they cannot escape. If coffee is now to be made, cold water is to be poured over a certain quantity of the powder and made to boil. Ground coffee prepared in this way, and which lay exposed to the air for one month, yielded, on being boiled, as good a beverage as one made of freshly-roasted berries.—*Popular Science Review.*

ON THE ANÆSTHETIC AND SEDATIVE PROPERTIES OF BICHLORIDE OF CARBON, OR CHLOROCARBON.

BY J. Y. SIMPSON, M.D.,

Professor of Medicine and Midwifery in the University of Edinburgh.

At different times I have inhaled the vapours of various fluids besides sulphuric ether and chloroform, with the view of ascertaining their anæsthetic or other therapeutic effects. Several years ago I published some notes on the results obtained from breathing chloride of hydrocarbon, nitrate of ethyl, benzin, aldehyde, and bisulphuret of carbon. (See the 'Edinburgh Journal of Medical Science' for April, 1848.) All these five fluids give off anæsthetic vapours, but in their manageableness and effects—and more especially in their after-consequences—they appeared to me to be very inferior to either chloroform or sulphuric ether. The same remark applies to other vapours which I have since tried, as those of kerosolene, etc.

Lately I have inhaled and used a liquid the vapour of which seems to me to approach nearer in its quality and effects to chloroform than any other anæsthetic agent. The fluid I refer to is one of the chlorides of carbon.

In describing the products of the action of chlorine on one of the anæsthetic fluids mentioned above, namely, chloride of hydrocarbon, or Dutch liquid, Mr. Fownes states (see his 'Manual of Chemistry,' seventh edition, p. 445) that three or four chlorides of carbon can be artificially made from Dutch liquid by the abstraction of successive portions of hydrogen and its replacement by equivalent quantities of chlorine. He enumerates as belonging to this series—1, sesquichloride or perchloride of carbon (C_4Cl_6); 2, protochloride of carbon (C_4Cl_4); 3, subchloride of carbon (C_4Cl_2); and 4, bichloride of carbon (C_2Cl_4).

The last of these compounds—the bichloride of carbon—is the new anæsthetic which forms the special subject of the present observations. It was first, I believe, discovered by M. Regnault, in 1839. It has already received various appellations from various chemists, as perchloroformene, perchlorinated chloride of methyl, dichloride of carbon, carbonic chloride, tetrachloride of carbon, superchloride of carbon, perchloruretted hydrochloric ether, and perchloruretted formene (see Gmelin's 'Handbook of Chemistry,' vol. vii. p. 355, and Watts's 'Dictionary of Chemistry,' vol. i. p. 765).

If it becomes, as I believe it will, for some medicinal purposes, an article of the materia medica, it will require to have a pharmaceutical name appended to it, and perhaps the designation of perchloroformene, or the shorter term chlorocarbon, may prove sufficiently distinctive. In its chemical constitution, bichloride of carbon, or chlorocarbon, is analogous to chloroform; with this difference, that the single atom of hydrogen existing in chloroform is replaced in chlorocarbon by an atom of chlorine, for the relative chemical constitution of these two bodies may be stated as follows:—

$$\text{Chloroform} = C_2HCl_3.$$
$$\text{Chlorocarbon} = C_2ClCl_3.$$

The chlorocarbon can be made from chloroform by the action of chlorine upon that liquid; and Geuther has shown that the process may be also reversed, and chloroform produced from chlorocarbon, by treating it in an appropriate vessel with zinc and dilute sulphuric acid, and thus exposing it to the action of nascent hydrogen. The most common way hitherto adopted of forming bichloride of carbon consists in passing the vapour of bisulphide or bisulphuret of carbon together with chlorine through a red-hot tube either made of porcelain or containing within it fragments of porcelain. There result from this process chloride of sulphur and bichloride of carbon, the latter being easily separated from the former by the action of potash.

The bichloride of carbon, or chlorocarbon, is a transparent, colourless fluid having an ethereal and sweetish odour, not unlike chloroform. Its specific gravity is great, being as high as 1·56, whilst chloroform is 1·49. It boils at 170° Fahrenheit, the boiling-point of chloroform being 141°. The density of its vapour is 5·33, that of chloroform being 4·2.

Besides trying the anæsthetic effects of bichloride of carbon upon myself and others, I have used it in one or two cases of midwifery and surgery. Its primary effects are very analogous to those of chloroform, but it takes a longer time to produce the same degree of anæsthesia, and generally a longer time to recover from it. Some experiments with it upon mice and rabbits have shown this—two corresponding animals in these experiments being simultaneously exposed, under exactly similar circumstances, to the same doses of chloroform and chlorocarbon. But the depressing influence of chlorocarbon upon the heart is greater than that of chloroform; and, consequently, I believe it to be far more dangerous to employ as a general anæsthetic agent. In a case of midwifery in which it was exhibited by my friend and assistant, Dr. Black, and myself, for above an hour, with the usual anæsthetic effects, the pulse latterly became extremely feeble and weak. In another case in which it was exhibited by Dr. Black, the patient, who had taken chloroform several times before, was unaware that the new anæsthetic was different from the old; her pulse continued steady and firm, although she is the subject of valvular disease of the heart. The surgical operations in which I have used chlorocarbon have been, the closure of a vesico-vaginal fistula, the division of the cervix uteri, the enlargement of the orifice of the vagina, and the application of potassa fusa to a large flat nævus upon the chest of a young infant. In all of these cases it answered quite well as an anæsthetic. The child did not waken up for more than an hour and a half after the employment of the caustic, which was used so as to produce a large slough. Its pulse was rapid and weak during the greatest degree of anæsthetic sleep. One of the mice exposed to its influence, and which was removed from the tumbler where the experiment upon it was made as soon as the animal fell over, breathed imperfectly for some time after being laid on the table, and then died.

Chlorocarbon, when applied externally to the skin, acts much less as a stimulant and irritant than chloroform, and will hence, I believe, in all likelihood be found of use as a local anæsthetic in the composition of sedative liniments.

In two cases of severe hysteralgia I have injected air loaded with the vapours of chlorocarbon into the vagina. The simplest apparatus for this purpose consists of a common enema syringe, with the nozzle introduced into the vagina, and the other extremity of the apparatus placed an inch or more down into the interior of a four-ounce phial, containing a small quantity—as an ounce or so—of the fluid whose vapour it is wished to inject through the syringe. Both patients were at once temporarily relieved from the pain. The first patient told me her relief at the first application of the anæsthetic vapour was so long that she slept during the following night far more soundly than she had done for weeks previously.

The injection of the vapour of chlorocarbon into the rectum does not prove so irritating as the vapour of chloroform. In one case it removed speedily pains in the abdomen and back.

Chloroform vapour applied by sprinkling a few drops on the hand, and held near the eye, is one of the very best and most sedative collyria in some forms of conjunctivitis, ulcerations of the cornea, with photophobia, etc. I have not yet tried the vapour of chlorocarbon, but perhaps it may answer still better, as less irritant, and almost as strongly sedative.

I have found ten or twenty drops injected subcutaneously by Dr. Wood's syringe repeatedly relieve local pains of the walls of the chest, abdomen, etc., without being followed by the distressing nausea so frequently the result of the hypodermic injection of preparations of opium and morphia.

Internally I have only hitherto tried it in small doses in gastrodynia, where it has the same effect as swallowing a capsule of chloroform.

The specimen of chlorocarbon which I have used was made by Mr. Ransford, who sent it down to Messrs. Duncan, Flockhart, and Co., of Edinburgh, under the idea that, by a chemical substitution, it might be converted into chloroform, and make a cheap medium for the manufacture of the latter drug. And perhaps I may be permitted here to remark that the quantity of chloroform used is now becoming very great, and possibly might be rendered greater if it could be produced at a still cheaper rate. We have two or three manufactories for chloroform in this city. The chief of these manufactories for it—that of Messrs. Duncan, Flockhart, and Company—now make upwards of 7000 doses of chloroform every day, counting two drachms as a full dose; they thus send out nearly 2,500,000 doses a year. Are every two million and a half full doses which are used of opium, antimony, aloes, Epsom salts, etc., attended with as little danger and as few ultimate deaths as these annual 2,500,000 doses of chloroform?—*Medical Times and Gazette*, Dec. 16th.

VERMIFUGE PROPERTIES OF PUMPKIN-SEEDS.

Whether the circumstance be due to the inefficacy of kousso, or the high price of the drug, pumpkin-seeds are again becoming with the profession a popular remedy for tapeworm. We may adduce, in illustration of this statement, two papers published in the month of August by M. Bouvier, a medical officer in the Belgian service, and by Dr. Desnos, of the hospitals of Paris.

M. Bouvier relates, in the 'Archives Médicales Belges,' that a little German boy, aged 5, and his sister, both presented symptoms of tapeworm after eating raw and smoked Westphalian ham. The little girl had been cured two years previously, but the boy, who had been ill three weeks only, was in a state of alarming emaciation. Pomegranate-bark had been exhibited, but its only effect was to induce severe colic. M. Bouvier then prescribed pumpkin-seed paste, prepared by bruising an ounce of the seeds denuded of their cuticle with sugar, and adding two ounces of milk. On the previous day, the child had taken two teaspoonfuls of castor oil, and was kept on low diet. The oil was repeated on the day which followed the exhibition of the paste, and no food was allowed.

The medicine was taken without repugnance, and produced neither colic nor nausea. Several motions were induced, in each of which fragments of the tapeworm were detected, and the head and hooklets were found next day in a hard stool. The mother having thus acquired the certainty that a cure was effected, at once displayed the undoubted proofs of the happy results of the medicine to Dr. Bouvier.

Dr. Desnos reports two closely analogous cases in the 'Journal de Chimie Médicale.' The patients were a saddler, aged 34, and an operative, aged 22. In the former, the leading feature was an enormous increase of appetite; he consumed as much as twenty-four pounds of solid food in the course of the day. The tænia was passed after two days' treatment. Forty-eight hours after his admission into hospital, the patient drank a bottle of seidlitz-water, and took an emulsion prepared with ten drachms of pumpkin-seeds, five drachms of castor-oil, and the same quantity of honey.

The medicine was exhibited in the morning, and in the afternoon the patient passed two mètres of tænia, with the head of the parasite.

In the second case, kousso had been resorted to without benefit. On the 9th of July, two days after the patient's admission, he was deprived of food, and on the 10th took an emulsion of pumpkin-seeds denuded of their cuticle, in six ounces of water, and half an hour later three tablespoonfuls of castor-oil, mixed with an equal quantity of peppermint-water. On the 11th the worm was passed entire, rolled up in a ball; the patient suffered some pain, but less violent colics than he had previously experienced from the kousso. On the 12th, castor-oil was again administered, and no relapse has since taken place.

Mr. Desnos remarks, in conclusion, that results even more favourable may be obtained from the combined action of the resinous extract of male fern with pumpkin-seeds; the following is the formula recommended by Dr. Debout:—

℞ Pumpkin-seeds, ʒx.
Sugar, ℥j.
Water, ℥vj.
Extr. of male fern, ʒj–ij.

To be taken fasting in four doses, at intervals of a quarter of an hour.—*Dublin Medical Press*, from *Journ. of Pract. Med. and Surgery.*

ANALYSIS OF CHINCHONA BARK AND LEAVES, RECEIVED JUNE 21st, 1865.

From W. G. M'Ivor, Esq., Superintendent of the Government Chinchona Plantations, Ootacamund, to C. G. Master, Esq., Secretary to the Government Revenue Department.

Ootacamund, 3rd May, 1865.

Sir,—I have the honour to forward by baughy a box containing a further supply of chinchona bark, as per memorandum annexed, for transmission to the Right Honourable the Secretary of State for India, in order that it may be submitted to Mr. Howard for analysis and report. The bark now forwarded was removed from the plants in the early part of April last, or as the sap begins to rise, as at this season the bark separates freely from the wood. Specimens Nos. 2 and 3 are renewed barks; these attain extraordinary thickness in a short period of growth; and if they contain a proportionate quantity of alkaloids, this system of treating the plants appears to offer greater advantages than the other methods proposed. I may observe that further observation seems to establish that this system of removing strips of bark from the stems of the plants can be practised without injury, provided the wound is instantly covered with damp moss; inattention to covering the wounds having produced the bad effects detailed in my letter of the 17th March, 1864.

MEMORANDUM.

Chinchona succirubra.—No. 1. Bark of three years and five months' growth, thickened by the application of moss. No. 2. Renewed bark of one year and five months' growth, being reproduced on the same portion of a stem which produced the bark given to Doctor De Vrij in November, 1863, and from which that gentleman obtained 8·409 per cent. of alkaloid. No. 3. Renewed bark of one year's growth, and gathered from portions of the stem which yielded No. 1 bark, submitted to Mr. Howard in the spring of 1864. No. 4. Bark of two years and five months' growth, not thickened by the application of moss.

Chinchona Calisaya.—No. 5. Bark of two years and five months' growth.

Chinchona Condaminea.—No. 6. Bark of one year and seven months' growth.

Chinchona micrantha.—No. 7. Bark of two years and five months' growth, thickened by the application of moss. No. 8. Ditto of same growth, but not thickened by the application of moss.

(Signed) W. G. M'IVOR,
Superintendent of the Government Chinchona Plantations.

REPORT OF AN ANALYSIS OF THE FOURTH REMITTANCE OF BARK FROM INDIA.

From J. E. Howard, Esq., F.L.S., to the Under Secretary of State for India, August 1st, 1865.

Sir,—I have the honour to report that I received, and have during the past month devoted much careful attention to the analysis of eight specimens of bark, referred to in a letter from Madras, dated 3rd May, 1865. The whole of the samples were in excellent condition, showing the care and skill bestowed on their cultivation. They contrasted most favourably with specimens from South America, of bark used at the present moment in the extraction of quinine. The mode of analysis I have followed, in the present instance, is that which is employed to ascertain the *commercial value*, which rests almost entirely with the *crystallizable sulphates*, with perhaps some slight loss of the residuary product. The results will compare well with those given in Delondre's 'Quinologie.'

No. 1 gave of crystallized sulphate, per 100 parts	6·00
of alkaloid soluble in ether (sp. gr. ·720)	0·94
of alkaloid insoluble in the above (therefore Chinchonine)	1·06

Mem.—The sulphate refined into white sulphate of quinine in appearance, but this did not stand the test used for commercial sulphate of quinine.

No. 2 gave of crystallized sulphate	5·00
of alkaloid soluble in ether	0·90
of alkaloid insoluble in ether. (Chinchonine)	1·80

Mem.—Refined as above.

No. 3 gave of crystallized sulphate	2·72
of alkaloids soluble in *alcohol*	7·00

Mem.—As I could only submit to examination 165 grains of the bark, the above result must be taken with reserve.

No. 4 gave of crystallized sulphate . . . . 2·43
of alkaloid soluble in ether . . . . 2·03
of alkaloid insoluble in ether. (Chinchonine) . . . . 0·60

Mem.—This specimen gave a product not refining quite so well as No. 1.

No. 5 gave of crystallized sulphate . . . . 0·70
of alkaloid soluble in ether . . . . 0·10
of alkaloid soluble in ether, but crystallized by evaporation . . . . 0·26
of alkaloids insoluble in ether. (Chinchonine) . . . . a trace.

Mem.—This sulphate did not stand the ether test.

No. 6 gave of crystallized sulphate . . . . 0·90
of alkaloid soluble in ether . . . . 0·60
of alkaloid insoluble in ether. (Chinchonine) . . . . a trace.

Mem.—The tests showed Quinine and Chinchonidine.

No. 7 gave of crystallized sulphate . . . . 5·82
of alkaloid soluble in ether. (Aricine) . . . . 0·29
of alkaloid insoluble in ether. (Chinchonine) . . . . 0·39

Mem.—This sulphate is that of *commercial* Quinidine, and contains probably no quinine.

No. 8 gave of crystallized sulphate . . . . 1·26
of alkaloid soluble in ether . . . . 0·60
of alkaloid insoluble in ether. (Chinchonine) . . . . a trace.

Mem.—The product similar to that of No. 7.

I beg to direct special attention to the remark, that the fine white crystallized *Sulphate of Quinine* (apparently) made from the bark of *C. succirubra* will not stand the test which is employed to distinguish the pure article in commerce. The cause of this I stated in my first report, viz. that "the crystallizations obtained are mixed with some sulphate of chinchonidine, which is commercially (but not medicinally) a disadvantage, and one which always attends the products of red bark." It is, of course, possible to separate the chinchonidine, but then this must very seriously diminish the percentage of six per cent. I obtained from this gross product little more than four per cent. refined in the first instance (though more subsequently), and of this I ascertained about ten per cent. as chinchonidine. This difficulty must be looked steadily in the face, and I would suggest that it may be obviated, either by a change being wrought in the opinion of the medical world as to the value of chinchonidine as a medicine, or by the plant being encouraged to produce quinine instead of chinchonidine.

The first might be, very probably, the result of a commission of inquiry composed of competent medical practitioners. I may mention that the late Dr. Royle entered zealously, at my suggestion, into the question, and satisfied himself by experiment as to the value of chinchonidine, but I am not aware that he left any written record of the result he attained. My own experiments confirm this view of the question, and I have shown* that this alkaloid (which must not be confounded with chinchonine) must have constituted (in whole or in part) the therapeutic agent in the cure of the Countess of Chinchon, as also that it was the alkaloid successfully employed at Philadelphia. The second alternative may seem visionary at first sight, but when we consider the results at which Mr. M'Ivor has arrived, and, further, the circumstances under which chinchonidine is produced, this view of the case may be altered.

In No. 7, we have an illustration of what careful cultivation will do, as the plant *C. micrantha*, which (with its congeners the grey barks) produces *largely* and *chiefly* chinchonine in its native climate of Huanuco,† now produces a very small portion of chinchonine, and a large quantity of the allied alkaloid *quinidine*. This is, then, a hopeful change, if time should confirm the observation.

Then chinchonidine seems almost always to accompany quinine *in greater or less abundance*. It does so in the *Calisaya* of Bolivia, in the *lancifolia* barks of New Gra-

* "Illustration of 'Nueva Quinologia,' *sub voce* Chahuarguera."

† A peculiar climate, of which I have recorded Mr. Pritchett's description under head *C. micrantha*.

nada, and in various barks of Ecuador and Peru, and markedly in the best of the barks of Loxa. It is highly probable that a very slight circumstance in the growth may determine the production of one or other alkaloid. Dr. Herapath has shown in a communication to the Royal Society, "Researches on the Chinchona Alkaloids,"* that the *quinine and chinchonidine salts agree closely among themselves, and differ widely from the quinidine and chinchonine compounds.*

I may further remark, that the *Chinchona succirubra* is a tree which varies greatly in its products in its native forests, and that the *Chinchona micrantha*, in Bolivia, approaches to the character of a *Calisaya*, as I have noticed under that head; its bark has a different appearance from that of Huanuco, and, again, this now sent home varies widely from either of the above. I notice, in examination, the peculiar yellow colouring-matter common, it seems, to all the forms of this species (*C. micrantha*), as I have before noticed.

The *Calisaya* bark sent this time by Mr. M'Ivor is, I fear, an illustration of the possibility of change in the wrong direction, as it contains far too large a percentage of chinchonidine in proportion to the quinine. The appearance of the bark indicates a not very vigorous growth, or, at all events, it differs from that it assumes in its native locality. It would never be recognized as the bark of *Chinchona Calisaya.*

The bark of No. 6 is recognized by an experienced dealer as "thin rusty crown, worth 1*s*. 3*d*. to 1*s*. 4*d*. per lb."† It is, I presume, the bark of the variety *Bonplandia, i. e.* the *colorada del Rey*, as brought home by Cross; it is remarked as more red than is customary with rusty crown.

As the quantity of bark in No. 1 and No. 4 was not exhausted in my experiments, I have returned 1000 grains of each of these, thinking that it would be a satisfaction to the Government to engage Dr. De Vrij, whose chemical skill and knowledge are so well known, in further researches on the subject.—I have, etc.

JOHN ELIOT HOWARD.

ON THE APPLICATION OF PHYSIOLOGICAL TESTS FOR CERTAIN ORGANIC POISONS, AND ESPECIALLY DIGITALINE.

BY C. HILTON FAGGE, M.D., AND THOMAS STEVENSON, M.D.

As the chemical processes for the detection of certain organic poisons are very inconclusive in their nature, and as many of these agents produce effects of a most remarkable kind on the lower animals, it is not surprising that their physiological action should have been employed as a test for their presence. Thus Dr. Marshall Hall suggested as a means of discovering strychnia, the tetanic symptoms which that alkaloid causes in frogs; and quite recently MM. Tardieu and Roussin produced a large mass of physiological evidence, in a French *cause célèbre*, in which digitaline was believed to be the poison used.

Those who have recommended the employment of evidence of this nature have always relied on the similarity between the symptoms observed in the case of supposed poisoning during life, and the effects obtained in the lower animals by the extract believed to contain the toxic agent; and as the action of poisons on man and on the lower vertebrata is certainly not always the same, the value of these physiological tests has been much disputed, and is not now admitted by most authorities in this country. It appears to us, however, that physiological evidence may be made independent of any relation of this kind. It is sufficient that the action of the substance believed to contain the poison on the animal experimented on be identical with the known effects of that poison *upon the same animal*, and that these effects be capable of being produced by no other agent or, at any rate, only by a limited number of other agents.

In this spirit we have conducted a series of investigations, with reference to the detection of digitaline and of certain allied substances. We selected that poison, not only because of the interest which attaches to it at the present time, but also because the

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* Dated 19th June, 1857.

† *From Messrs. Jenkins and Phillips to Mr. J. E. Howard.*—"51, Lime Street, 21st July, 1865.—The sample of bark you left with us appears to be thin rusty crown, worth 1*s*. 3*d*. to 1*s*. 4*d*. per lb. We thank you for the sight of it."

chemical tests for it are peculiarly inadequate. The animals which we employed in all our experiments were frogs. Their sensibility to small quantities of poison, the fact that they are but little liable to be affected by fear or other accidental circumstances, and the independence of their organs, which makes it possible to determine with accuracy the nature of the effects produced, render them better adapted for this purpose than any other animals; and the objection ordinarily urged against their use, that the action of poisons on them is often different from that of the same substances on the higher animals, has no validity when the question of physiological evidence is looked at from our point of view.

It has been expressly denied, by those who have advocated the use of physiological tests, that animal extracts, such as those obtained from the contents of the human stomach, or from vomited fluids, could in themselves be poisonous to the lower animals. We thought it desirable, however, to make some direct experiments upon this point; and, to our surprise, we found that in almost every instance the toxic action of such extracts was most decided and unmistakable. The effects produced were indeed very different from those caused by digitaline; and we think that we have been able to distinguish quite clearly between them. Still, the recognition of the fact that these extracts exert a poisonous action, independently of the presence of any of the ordinary toxic agents, must have an important bearing upon the application of physiological evidence. Unless some points of difference should hereafter be discovered, it will render impossible the detection of many vegetable substances (among which we may mention lobelia, emetina, Veratrum viride, and Delphinium Staphysagria) by their physiological effects. And it makes invalid (at least so far as frogs are concerned) all evidence of this kind, in which the state of the heart is not more particularly described than has hitherto been the case. On the other hand, although this was not the primary object of our inquiries, we may remark with reference to the frog-test for strychnia, that tetanic spasms were produced by none of the numerous substances with which we experimented, except veratrine and theine. It is of course well known that other agents, and notably some of the constituents of opium, produce tetanus in frogs; but on the whole our experiments lead us to hope that this test will hereafter be found of more value than is now generally supposed to be the case.

We have devoted a considerable number of experiments to the solution of the practical question, whether it be possible to obtain the characteristic effects of digitaline, not only from the extracts of liquids to which it had been artificially added, but also from extracts of the stomach-contents and vomited matters of dogs poisoned by that substance. The results of these experiments were perfectly satisfactory; and we think that our observations show conclusively that there is no difficulty in obtaining from these complex mixtures physiological effects identical with those of a pure solution of digitaline.

Far more difficult to decide than the question of practical applicability, is the question as to the theoretical accuracy and conclusiveness of the physiological test for digitaline and the allied poisons. To this question we do not venture to give a positive answer. Our experiments justify, as we think, the hope that this test will be hereafter found of very considerable value in aiding in the detection of these substances; but it can be only by the combined labours of many observers, and not merely by one series of experiments, that this point can be finally settled.

The following are the conclusions at which we have arrived, and which are deduced from our own experiments in every instance, except where the contrary is expressly stated, under heading 2.

1. Digitaline is one of a small class of substances of which the action on frogs appears to be identical. As the heart is the organ primarily affected by them, they may be called cardiac poisons, so far as frogs are concerned.

2. These substances are, besides digitaline, the *Upas Antiar*, the *Helleborus viridis*, and perhaps other species of *Helleborus*, the *Tanghinia venenifera*, the *Dajaksch* or arrow-poison of Borneo, the *Carroval* and *Vao*, South American arrow-poisons, and the *Scilla maritima*. Of these we have ourselves experimented only with digitaline, antiar, the *Helleborus viridis* and the *H. niger*, and the *Scilla;* and we believe that we are the first observers who have recognized the identity of the action on frogs of the last of these plants with that of the other substances placed in this group. Besides digitaline, only two of them, namely, the *Helleborus* and the *Scilla*, are likely to be the subject of medico-legal investigation in this country, and that but rarely.

3. The characteristic effect of each of these agents on frogs is the production of irregularity of the heart's action, followed by complete stoppage of its pulsations; the ventricle remaining rigidly contracted, and perfectly pale, after it has ceased to beat; the muscular power of the animal being at this time unimpaired, and persisting as long as in frogs in which the circulation has been stopped by other means, such as ligature of the heart.

The irregularity in the heart's action, which precedes its stoppage under the influence of these poisons, is peculiar. The rhythm is but little altered; and the beats are not necessarily diminished in number, as has been supposed. Sometimes, however, the ventricle makes only one pulsation for two of the auricles, the number of its contractions being therefore lessened by one-half. More frequently the irregularity consists in one or more portions of the ventricle (especially the apex) becoming rigidly white and contracted, while the remainder of the organ continues to dilate regularly. When the yielding portions are small, a peculiar appearance, as if the wall of the ventricle formed crimson pouches or protrusions, is produced.

4. No other substance, except those mentioned above, has been found to produce this chain of effects, even in a single experiment. We have ourselves tried nineteen different substances, consisting of vegetable extracts and alkaloids. Of these, *emetina*, and the extract of the *Delphinium Staphysagria* caused somewhat similar irregularity of the cardiac beats; but in frogs, poisoned by these agents, the muscular power was always lost before the heart had ceased to beat, and the ventricle stopped in the dilated, and not in the contracted state.

5. When digitaline is applied endermically to frogs, the characteristic effect is invariably produced, if a sufficient quantity be used. This quantity no doubt varies with the size of the animal, but may be stated generally at $\frac{1}{100}$th of a grain. Quantities less than $\frac{1}{150}$th grain usually produce no effect, or at most only temporary irregularity of the heart's action, of a more or less characteristic kind. The results of the injection of doses larger than $\frac{1}{100}$th grain is to diminish the interval between the administration of the poison and the stoppage of the ventricular beats. This interval appears to be seldom less than six or seven minutes, however large the quantity of digitaline.

6. Very poisonous effects are produced in frogs by the endermic application of alcoholic or acetic extracts of matters vomited by patients, or taken from the human stomach after death. The extracts are less poisonous, if at all, to the higher animals.

7. The symptoms produced by these extracts in frogs are in marked contrast to those caused by the cardiac poisons. Like these agents, the animal extracts impair the action of the heart; but their tendency is to cause paralysis of its muscle, and stoppage in the dilated condition. At the same time, they generally destroy the muscular power of the animal.

8. The cause of the toxic action of these animal extracts has not been ascertained; it is probably not always the same, as the effects produced by different extracts are not perfectly similar. These effects are perhaps the result of the combined action of different substances. They are certainly not caused by bile or pepsine, and probably not by any substance in a state of decay.

9. The vegetable acids, when injected in sufficient quantity, stop the action of the heart more rapidly than any poison with which we are acquainted, the organ remaining distended with blood when it has ceased to beat. The toxic action of the animal extracts is not, however, caused by these acids; for the quantity of them contained in the extracts is too small, and the effect is not diminished by neutralization with an alkali.

10. When digitaline, in quantities of $\frac{3}{4}$–$\frac{1}{4}$ grain, is added to vomited matters, or to fluids taken from the human stomach *post mortem*, the extracts obtained from such fluids almost invariably produce on frogs the effects of digitaline.

11. This is due partly to the fact that the action of digitaline is generally more rapid than that of the poisonous constituents of the extracts themselves, but principally to the circumstance that it was necessary to give only small doses of the extracts containing digitaline, in order to get the characteristic action.

12. The method of dialysis fails in many cases to separate digitaline from complex organic mixtures which contain it; and this method is rarely of service in aiding the detection of this poison by the physiological test.

13. When digitaline was administered to dogs in quantities little more than sufficient

to destroy life, the extracts derived from the matters vomited by these animals, or from the fluids contained in their stomachs after death (when vomiting was artificially prevented), were found to produce on frogs unmistakably the effects characteristic of the presence of one of the cardiac poisons. Three dogs were killed in this way; and in each case the results obtained were perfectly satisfactory.

NOTE.—Received 18th May, 1865.

We have now to add to the list of "cardiac poisons" the Manganja, an arrow-poison, brought from the Zambesi Expedition by Dr. Kirk. Our attention was directed to this substance, which is the fruit of an Apocynaceous plant, by Dr. Sharpey, who informed us of the results of experiments he had made on its action; and we owe to his kindness the opportunity of confirming his observations by our own experiments.—*Proceedings of the Royal Society, May* 18, 1865.

TEST FOR OTTO OF ROSES.

Hager mixes five drops of the otto to be tested with twenty drops of pure concentrated sulphuric acid. Whether the oil be adulterated or not, a thick yellowish-brown or reddish-brown mixture results. When this mixture is cold, it is shaken up with three drachms of absolute alcohol. If now the otto is pure, a tolerably clear yellowish-brown solution results, which, after heating to boiling, remains clear. But if the otto is adulterated with geranium, palm rose, or pelargonium oil, the solution remains very cloudy, and in some cases a darker fluid separates, in which a deposit forms. On heating this solution, the sediment melts together, and from the size of the mass the author infers the degree of adulteration. If, for example, the mass has one-fourth the volume of a drop, he concludes that the otto was mixed with at least one-third of foreign oil. If the otto is adulterated with spermaceti, this substance separates and floats on the surface of the solution, or remains suspended in the liquid as a scaly crystalline mass. The above test is founded on the circumstance that pure otto of rose forms, with strong sulphuric acid, a resinous substance, which is completely soluble in absolute alcohol; while the substance formed with other oils is only partially soluble. Guibourt has observed that the odour of pure otto is not affected by mixture with strong sulphuric acid, but if other oils are present a disagreeable odour is developed.—*Chem. News, from Zeitschr. für Analyt. Chem.*

COPAL RESIN.

To clear up any of the doubts which exist as to the true source or rather sources of this resin, would be to solve one of the many problems in economic botany. The term Copal, as is well known, is applied in commerce to most clear resins capable of producing a colourless varnish; for instance, East Indian Copal or Piney Varnish is produced by *Vateria indica*, L., a tree of the Natural Order *Dipterocarpaceæ*, while the African copals are undoubtedly the produce of Leguminous trees. The source of gum anime is another of these economic puzzles. One of the differences between these two resins—copal and anime—is that the former is mostly very clear and almost colourless, while the latter is always of a brownish tint. Both resins are sometimes rough on the surface, caused by the action of sand while the resin is in a soft state. The trees grow in the neighbourhood of the seashore, and the resin exuding trickles down and buries itself in the sand beneath. This roughened surface, called at Zanzibar "goose skin," is, of course, found only on the resin which has been buried, but the distinguishing characters of the resins themselves are so well known as hardly to need mention; what we are chiefly concerned about is to know how many distinct plants furnish the Copal of commerce.

Lieut.-Col. Playfair, H. M. Consul at Zanzibar, has recently transmitted to the Kew Museum, in answer to a request of the late Sir W. J. Hooker, some fine specimens of the bark of a tree with the resin *in situ*, together with fruits of the same plant, and various specimens of collected resin. On the bark the resin is thickly formed in large irregular masses; the external appearance is of a dusky grey, but its fracture is of a clear light shining yellow. The tree yielding this resin, Colonel Playfair thinks, is the true Copal of the mainland of Zanzibar; this is an announcement of some importance, in support of which we anxiously look for further confirmation. Believing, however, the fruits to be what Colonel Playfair sends them for, viz. the fruits of the Zanzibar Copal tree, there seems to be little doubt, on comparing them with specimens in the Kew Herbarium, that they belong to *Hymenæa mossambicensis*, Kl. Colonel Playfair says in his report to the Foreign Office, in answer to Earl Russell's inquiries respecting the supply of resin, that the value of copal exported from Zanzibar amounted during the year 1863–4 to 163,353 dollars, the average price being about six pounds for one Austrian dollar. The sums were made up as follows:—

	Dollars.
United Kingdom	30,030
British India	50,044
Kertch	500
United States	5,000
Hamburg	30,000
Italy	2,339
Total	163,353

If, therefore, a revenue like this is derived from the resin of this particular plant in Zanzibar, it would be well if Madagascar, where the plant likewise grows, could open up a similar traffic in the same commodity.

Captain Burton says of the Zanzibar Copal tree, that out of its trunk "canoes have been formed 60 feet long, and that a single tree has sufficed for the keelson of a brig; the average size, however, is about half that height, with from 5 to 6 feet girth near the ground." The trunk "is dotted with exudations of raw gum, which is found scattered in bits about the base." The resin is also found in a semi-fossil state, sometimes in places overflowed by the high tides, or when sinking piles for huts, etc.

Captain Burton further says that "the East African seaboard from Ras Gomani in S. lat. 3°, to Ras Delgado in 10° 41′ with a medium depth of 30 miles, may be called the Copal Coast."

At Zanzibar the resin is sifted and cleansed from impurities before it finds its way into the hands of the foreign merchants; after this it is again cleansed by washing in chemical solutions of various degrees of strength, care being taken to thoroughly purify, but at the same time not to injure the so-called "goose-skin," or the impress of the sand.

All parts of the plants of the copal-yielding species of *Hymenæa* are highly charged with resin, and in none is it more apparent than in the fruits of the species sent home by Colonel Playfair. The little warts or verrucosities upon the surface of these pods are lumps of clear, colourless resin, simply covered with the thin epidermis or cuticle of the pod. To such an extent are these pods charged with resin, that they burn freely upon the least approach of flame. The same property is observable in the pods of the South American species, *Hymenæa Courbaril*, from the trunk of which exudes very large quantities of resin; but this pod being larger and more ligneous, and the resin distributed in small ducts all over the surface without penetrating the substance of the pod, does not burn so readily, nor is the quantity of resin so large. The outside of these pods much resembles in appearance the sand-fretted surface of the resin.—*Gardeners' Chronicle.*

OLEUM ERIGERONTIS CANADENSIS AS A REMEDY IN HÆMORRHAGE, DIARRHŒA, AND DYSENTERY.

BY J. W. MOORMAN, M.D., OF HARDINSBURG, KY.

(*American Journal of the Medical Sciences*, *Oct.* 1865.)

"This medicine," writes Dr. Moorman, "deserves to be ranked among the best remedies in all forms of hæmorrhage, and in some forms of diarrhœa. With a somewhat extended knowledge of its effects in such cases in private practice, I cannot call to mind a single instance in which it failed to produce the desired effect. In cases of diarrhœa, from debility and relaxation, I have found it to be a most useful remedy, as also in dysentery, after the stomach and bowels have been relieved by purgatives. In these cases it seems to relieve by increasing the tonicity of the muscular fibres of the intestines, and correcting the depraved secretions.

"The dose recommended in the 'United States Dispensatory' is from five to ten drops, given every two or three hours; but I have given much larger doses, as will be seen by reference to my cases. (The author gives the particulars of several cases treated by him in the paper.—Ed.) Such heroic doses are hardly necessary, unless in very urgent cases. Those in which I used it were already so much debilitated, by long-continued disease, that they were unable to stand such a large drain upon the sanguiniferous system; these doses were resorted to to check the hæmorrhage, and offered a last hope for life. It may be given in a little water, to which a small quantity of sugar may be added, if the patient desires it. In cases of hæmoptysis ten or fifteen drops may be placed on a handkerchief and inhaled, at the same time it is taken internally; the same method will answer in epistaxis. In diarrhœa, fifteen drops every four hours, until it is relieved, will, in most cases, be sufficient. In dysentery it is always best to precede its use by a dose of castor-oil, to remove all irritating matter from the stomach and bowels, and, even then, I must confess, I have not obtained the gratifying results which some claim to have derived from its use in this affection. I have, however, in every case derived more or less advantage from its use. In hæmorrhages and diarrhœa of debility, I know of no better remedy, and I trust the profession will give it a trial and let us know the results."

BRAHEE SUGAR.

Our readers will doubtless have had numerous inquiries for this so-called infallible remedy for rheumatism. Since the appearance, in the 'Lancet' of December 30, of an anonymous communication, or at least, of a communication from one who was not anxious that his name should appear, relating a number of cases all of which were said to have been successfully treated by this remedy, but giving no dose, nor any indication of its nature, medical men have been anxious to try so remarkable an agent. Applications for the article were repeatedly sent to Mr. T. Finlayson, Pharmaceutical Chemist, Leith, but without success, when, in the 'Lancet' of January 13, appeared the following letter from Mr. Finlayson, which throws some light on the subject:—

"Sir,—The gentleman at whose request I dispensed the preparation which he calls 'Brahee sugar' having intimated to me that for the present he prefers not to disclose its source and composition, and that he has made arrangements with a wholesale house for its sale, I feel it needful in these circumstances to take this mode of expressing regret for my apparent neglect in not having replied to the numerous inquiries which have been addressed to me regarding it. These have all been handed to the introducer of the substance, and I am assured will be immediately attended to.

"I am, Sir, yours respectfully,

"*Leith, January 9th*, 1866." "Thos. Finlayson, M.P.S.

We have seen some of these powders in packets, as a patent medicine, which have both the appearance and taste of sugar of milk.

ON TORBITE (A NEW PREPARATION OF PEAT) AND ITS USES.*

BY D. K. CLARK, C.E.

The writer had occasion a short time since to inspect professionally the works at Horwich, in Lancashire, to manufacture fuel and charcoal from peat, and was so struck with all that came under his notice, and impressed with the importance of the results obtained, that he feels he cannot bring a more interesting subject before the meeting.

The question of the manufacture of peat into fuel is in reality a question of supplementing the natural supplies of coal with a fuel which may be made superior to it in

* Read before the British Association.

every respect, more abundant and more readily accessible. The consumption of coal is so enormous and goes on annually increasing at such a rate, that for some time past, serious apprehensions have been entertained that our coal-measures will be exhausted at no very distant period. Our stock of coal, excluding all that lies at a greater depth than 4000 feet, has been estimated at 83,544,000,000 tons. In 1863 the consumption reached 86,300,000 tons; and the average rate of increase for the last ten years has been two millions of tons a year. Thus, supposing our stock to have been correctly estimated, in less than 100 years our coal will be exhausted. Fortunately, however, nature has not left us dependent on our coal-measures alone, but has also given us our bogs.

Peat, it is well known, possesses many most valuable properties as a raw material for fuel, but the attempts hitherto made to utilize peat on a large scale have proved failures, owing to the difficulty of dealing with a substance exceedingly bulky, very loose, and holding from 75 to 85 per cent. of water.

To separate the water and to condense and mould the peat into convenient sizes at a cost sufficiently low to render it commercially available as fuel, is a problem which has baffled the efforts of many operators. In most instances, compression has been applied for the purpose of imparting the requisite degree of solidity, by means of powerful hydraulic presses or other machinery. In the process adopted by Messrs. Gwynne and Mr. C. Hodgson, the peat is first dried and powdered, and then pressed into blocks; but the action of compression is purely mechanical, and though it imparts great compactness by bringing the particles of the peat into close contiguity, it does not really solidify the substance, since on being exposed to heat it resumes its original form and crumbles to pieces. Fuel thus prepared is totally incapable of resisting the action of a blast or even of a moderate draught; and though Mr. Hodgson still carries on the manufacture of fuel by his process, the consumption is very limited.

According to Mr. Cobbold's mode of treatment the peat is immersed in water for the purpose of separating the fibre from the more decomposed matter, and the water is afterwards got rid of either by simple evaporation or by means of centrifugal power; but though by this means a very dense fuel is obtained, the separation of the fibre deprives the fuel of coherency, besides which the process is laborious and costly. Attempts have also been made in Ireland to utilize peat by manufacturing it solely for the sake of its chemical products. Many valuable products have thus been obtained, from which even paraffin candles have been made, but the cost far exceeded the market value.

But such attempts have not been altogether in vain, inasmuch as the experience thus gained in the treatment of peat has proved of great value. To know what will not do is a great step towards knowing what will do; and the more recent patents show, almost in the order of their dates, the slow but steady progress that has been made until one arrives at the system of manufacture recently inspected by the writer at Horwich: according to this system mechanical compression in any manner is studiously avoided, being not only costly but also inffectual. Advantage has, on the contrary, been taken of the natural property of peat, suitably prepared, of contracting as it parts with its moisture and becoming perfectly solid and cohesive. The means of separating the water suspended in the peat have, too, been carefully perfected. The necessity of dealing with, and getting rid of, such a large proportion of water has been a standing difficulty from the first, and the cause of excessive expenditure. At Horwich the problem has been carefully studied, and the difficulties appear to have been successfully overcome. Until a mode of artificially drying peat rapidly and economically had been worked out, air-drying was necessarily resorted to; and where limited quantities of fuel—say about 100 tons a year—only are required to be made, air-drying may suffice, but for large quantities it would be, in our fickle climate, too uncertain a process to be depended on, and for seven months in the year it would not be available at all.

According to the system matured and established at Horwich, the peat, as it comes from the bog, is thrown into a mill, expressly constructed, by which it is reduced to a homogeneous pulpy consistency. The pulp is conveyed, by means of an endless band, to the moulding machine, in which, while it travels, it is formed into a slab and cut into blocks of any required size. The blocks are delivered by a self-acting process on a band, which conveys them into a drying chamber, through which they travel forwards and backwards on a series of endless bands at a fixed rate of speed, exposed all the time to the action of a current of heated air. The travelling-bands are so arranged that the blocks of peat are delivered from one to the other consecutively, and are by the same movement turned over in order to expose fresh surfaces at regular intervals to the action of the drying currents, so that they emerge from the chamber dry, hard, and dense. To the peat substance thus treated the name of "torbite" has been given, from the Latin *torbo*, by which name peat is constantly mentioned in ancient charters.

The next stage in the process is the treatment of the torbite in close ovens, when it may either be converted into charcoal for smelting purposes, or may be only partially charred for use as fuel for generating steam, or in the puddling furnace.

The whole of the Horwich system has been planned with a view to the utmost economy of time and labour. The raw peat is nearly altogether automatically treated by steam power: introduced at one end, it issues from the other in the form of charcoal within twenty-four hours after it is excavated from the bog, and the manual labour expended is almost entirely limited to the first operation of digging, consequently the actual outlay in labour and fuel in the production of the charcoal does not exceed from 10*s.* to 12*s.* per ton; but, in addition to the economy thus effected by charring, in close ovens, a considerable quantity of valuable chemical products are yielded, as ammonia, acetic acid, pyroxylic spirit, paraffin oils, the sale of which alone nearly cover the expenses of the whole process.

The fatty matter separated by distillation forms an excellent lubricating grease, the yield of which averages about 5 per cent. of the weight of charcoal produced; in its crude state it has been sold for £12 per ton at Horwich.

The charcoal made from torbite is extremely dense and pure; its heating and resisting powers have been amply and severely tested, and with the most satisfactory results. At the Horwich works pig-iron has been readily melted in a cupola. About eighty tons of superior iron have been made with it in a small blast furnace measuring only six feet in the boshes, and about twenty-six feet high. The ore smelted was partly red hematite, and partly Staffordshire, and the quantity of charcoal consumed was one ton eleven hundredweight to the ton of iron made; but in a larger and better constructed furnace, considerably less charcoal will be required. It has also been tried in puddling and air furnaces with equally good results, considerably improving the quality of the iron melted. For this purpose the fuel was only partially charred, in order not to deprive it of its flame, which is considerably longer than that from coal. Some of the pig-iron made at Horwich was then converted into bars, which were afterwards bent completely double when cold without exhibiting a single flaw. Messrs. Brown and Lennox, in testing this iron for chain cables, have reported that its strength was proved to be considerably above the average strength of the best brands.

In Germany, peat mixed with wood charcoal is very extensively used in the production of iron, the peat as prepared there not being sufficiently solid to do the work alone; but it is found that the greater the proportion of peat that can be used, the better is the quality of the iron produced. The gas delivered from the high furnaces has also been satisfactorily employed in the refining of iron and the puddling of steel. The value of peat in the production of iron has long been established. Iron metallurgists are agreed in the opinion that iron so produced is of very superior quality. In every stage of iron manufacture, and in welding, peat charcoal is most valuable. At Messrs. Hick and Son's forge, in Bolton, a large mass of iron, about ten inches square, was heated to a welding heat with peat charcoal made at Horwich. The time occupied was less than the operation would have taken with coal; the whole mass was equally heated through without the slightest trace of burning on the outside, and in hammering out the mass as much was done with one heating as ordinarily required two heatings to effect.

The importance of obtaining an abundant supply, at cheap rates, of peat charcoal cannot, therefore, be too highly estimated.

For the generation of steam the fuel made at Horwich has also been well tested, and its superiority over coal practically demonstrated both in locomotives and stationary engines. On the Northern Counties Railway of Ireland a train was driven with it from Belfast to Portrush, a distance of seventy miles. The result at the end of the journey showed a saving, as regards weight consumed, of 25 to 30 per cent. over the average of three months' working with coal on the same journey. There was an excess of steam throughout the run, though the fire-door was constantly open and the damper down. At starting, the pressure was 100 lb., but during the trip and while ascending a steep incline it rose to 110 lb., and afterwards to 120 lb. with the fire-door open. While running there was no smoke, and very little when standing still.

At the Horwich works the fuel was tested against coal under the boiler there. This was done on two consecutive days, the fire having on each occasion been raked out the night previous.

The following results were obtained:—Coal got up steam to 10 lb. pressure in 2 hours 25 minutes, and to 25 lb. pressure in 3 hours; peat fuel got up steam to 10 lb. in 1 hour 10 minutes, and to 25 in 1 hour 32 minutes; 21 cwt. of coal maintained steam at 30 lb. pressure for $9\frac{3}{4}$ hours; $11\frac{1}{4}$ cwt. of peat fuel maintained steam at the same pressure for 8 hours.

But in addition to this a large economy is effected by the use of peat fuel for the generation of steam in the saving of boilers and fire-bars from the destruction caused by the sulphur in coal, from which peat is free. In Bavaria, peat fuel has been used on the railways for several years past, and the economy effected by its use in the wear and tear of the engines is stated by the officials in their reports to be very considerable.

The bogs of Great Britain and Ireland cover an area exceeding five millions of acres, the average depth of which may be taken at twenty feet. Nature has thus supplied us with the means of adding to our stock of fuel some twenty thousand millions of tons.

In Ireland, about a million and a half of acres have been thoroughly surveyed. In the reports of these surveys it is stated that beneath the peat an excellent soil, well situated for drainage, was found fit for arable or pasture land. When it is considered what peat is capable of doing, and all the results involved in the question of utilizing peat, it is impossible not to feel impressed with the conviction that in what has been accomplished at Horwich, the foundation has been laid of an undertaking of great national importance and interest.

ILLICIT SALE OF METHYLATED SPIRIT.

The following case is reported in the 'Preston Herald,' December 30:—

At the Preston Police Court on Thursday (before Paul Catterall, Peter Catterall, and S. Smith, Esqs.), Mr. James Alexander Bell, druggist, etc., formerly of the corner of Walker Street, Friargate, and now of North Road, and a noted dealer in "Indian Brandee and Indian Whiskee," was charged with the following:—"That you, after the passing of a certain Act of Parliament, made and passed in the year of our Lord 1861, and intituled 'An Act to amend the laws relating to the Inland Revenue,' and within six calendar months before the exhibiting an information of the charge, to wit, on the 3rd day of August, 1865, to wit, at Friargate, in the borough of Preston, you not being a distiller or rectifier of spirits, or other person duly authorized or specially licensed by the Commissioners of Inland Revenue to mix and make methylated spirit, sold, to wit, to William Lane, certain methylated spirits, without having in force a licence in that behalf granted under the authority of the said Act, contrary to the form of the statute in that case made and provided, whereby and by force of the statutes in that case made and provided you have for your such offence forfeited £50; and it is further alleged that you, after the passing of the said Act, and within six calendar months before the day of exhibiting the said information, to wit, on the day and year aforesaid, to wit, at Friargate aforesaid, in the borough of Preston, sold certain methylated spirits, to wit, to the said William Lane, *as and for a beverage*, contrary to the form of the statute in that case made and provided, whereby, and by force of the statute in that case made and provided, you have for your such offence forfeited the further sum of £100."

This charge having been read to the defendant, he said: "I deny it altogether; there is no truth in it. We have never had methylated spirit in our place for six or seven years. I can prove that abundantly."

Mr. Watson, who conducted the case for the Inland Revenue authorities, said that prior to the year 1855 it was not permissible to use anything in the shape of spirits of wine without paying heavy duty; but this was found to bear heavily upon manufacturers, and it led to the passing of a statute in 1855, which allowed a mixture of spirit of wine, methylated liquor, to be used in arts and manufactures. The section stating this then went on to say that it shall be used "as such commissioners shall from time to time approve, order, and direct;" and for the satisfaction of such commissioners the persons who used it "shall render such spirit unfit for use as a beverage." That was the origin of the allowing of methylated spirit to be used at all; but in 1861 there was a further extension of the Act, and he would read to them the sections bearing upon the question before them. Mr. Watson then read the following:—

Whereas, by an Act passed in the 18th and 19th of her Majesty Queen Victoria, certain restrictions are imposed upon the sale of methylated spirits, and it is intended to remove such restrictions in part, and to make other regulations in regard to the sale of methylated spirits.

"Section 1. Any person not being a distiller or rectifier, or a dealer in or retailer of beer, spirits, wine, or sweets, may take out an excise licence authorizing him to receive and sell methylated spirit in the quantity allowed by this Act on payment of the annual duty on such licence of £2. 2*s*., and every person taking out such licence shall be called 'a retailer of methylated spirit;' and so far as regards any person licensed to retail methylated spirit under this Act, and so far also as regards any person who shall purchase such spirit from such licensed person, and the spirit so purchased, sections 8, 10, and 16 of 18 & 19 Vict. c. 38, shall be repealed."

Now that allowed, as the Bench would see, persons to sell methylated spirit on payment of £2. 2*s*. for a licence. The charge against Mr. Bell was also under the 5th and 6th sections of the said Act. The 5th section says:—

"Every person not being a distiller or rectifier, or other person duly authorized or specially licensed to make methylated spirit, who shall sell any such spirit in any quantity without having in force a licence granted under this Act, shall forfeit £50 over and above all other penalties to which he may be liable under any other Act or Acts."

Section 6 says: "If any person whatever shall colour, purify, flavour, or prepare methylated spirit in any manner to fit or with intent to fit such spirit for use as a beverage, or for mixing with any beverage, or shall sell such spirit, whether coloured, purified, flavoured, or prepared in any manner or not as and for a beverage, or mixed with any beverage, he shall forfeit for every such offence £100, and the spirit shall also be forfeited."

Many complaints were made from various parts of the town, that Mr. Bell was acting contrary to this statute by selling methylated spirits very largely. The case was reported at Somerset House, and Mr. Lane, the supervisor of excise, went on the 3rd of August and purchased liquids which would be brought before the court. Those liquids have been analyzed by a chemist employed at Somerset House, and he would tell them that those liquids contained methylated spirit; that they were about the quality of strong gin, and might be used, and no doubt were commonly used as a beverage—in fact, the labels put by Mr. Bell upon the bottles containing the liquids would show abundantly that they were intended for that purpose. He might mention that it was first permitted to sell methylated spirit; then experiments were made in order to prevent, if possible, it being used as a beverage or potable liquor. They fancied at the time that, by mixing it with 9 per cent. of wood naphtha, it would have that effect. From these mixtures they gave it the name of methylated spirit, combining two Greek words to make an English one. But the defendant seemed to have overcome the impediment, and by doctoring it in some peculiar manner, had produced an article that was potable. One of the bottles containing the liquor purchased by Mr. Lane had a label upon it, beginning, "The only genuine and highly cordialized Indian Brand*ee*;" merely substituting *ee* for *y*. Then it went on:—

"Dose—For adults, one tablespoonful; 10 to 15 years, half a tablespoonful; 7 to 10 years, one large tea-spoonful; 2 to 7 years, half a teaspoonful—to be taken in warm water or gruel. Recommended to be used everywhere; admirably adapted for everybody; calculated to save scores of pounds in doctors' bills; the real boon to the people of this country; the very best and only genuine in England. Sold at 3*d*. an ounce. Medical Hall, 95, Friargate, Preston, Lancashire."

Another was printed in very large characters, and was as follows:—

"The original and only genuine old English Whisk*ee*, combined with that grand stomachic the essence of hops. Ye who suffer from gravel or pains in the back or side, try it; all ye who know too well what nervous affections are, try it; we say to every one who has a gnawing pain at the pit of the stomach, try it; all ye young women who are not as you ought to be, try it; yea, let everybody try it; for it is fit for the aged, safe for the young, gentle for the disabled, and sure for the strong. It is, indeed, the family medical prize medal."

Mr. Watson said it would be observed that he again omitted the *y*, and substituted the *ee*, as if any orthographical change could make any difference in the non-permissibility of using it. The reason why the charges had stood over so long was because the analytical chemist had been unwell, and unable to travel until now.

Mr. William Lane was then called. He said: In August last I was supervisor of excise in Preston. In pursuance of instructions from Somerset House, I called at Mr. Bell's shop in Friargate. He is a chemist and druggist. I saw in the shop one of his assistants; I believe it was Mr. Bell's son. I asked for a pint bottle of Indian Brandee, and also a pint bottle of Indian Whiskee. I was supplied with the two bottles now produced, with the two labels upon them as now exhibited. I paid 6*s.* for each bottle. Having purchased them, I took them to my office and put labels in my own handwriting upon them. I sealed both bottles up, and sent them to Somerset House Laboratory in the usual way. In June, 1864, I cautioned the defendant against selling methylated spirits. I was ordered to do so by the authorities at Somerset House.

The defendant, who conducted his own case, was here informed that he might question the witness upon his evidence. Instead of doing so, he said: The charge against me is for selling methylated spirit. We have not had any on our premises for six years.

Mr. Paul Catterall: You had better confine yourself now to asking questions.—Defendant: Did I not come to you (Mr. Lane) about six or seven years ago, and tell you, in your own parlour, that I had some thoughts of making a medicine of spirits of nitre, which we all know is a very useful medicine, and calling it a certain name? Did I not say that spirit of nitre was unpalatable in the old way in which it had been used, and did I not ask you if I should be doing anything wrong if I manufactured it?—Mr. Lane: You asked me whether, by selling Indian Brandee, you were doing anything illegal, and I told you that there was no illegality about it, so long as there was no spirit in it.—Defendant: Did I not say spirits of nitre?—Mr. Lane: No.—Defendant: Well, I had nothing else to make it of. You must have said it and forgotten it.—Mr. Lane: You said tinctures and syrups alone.—Defendant: There is nothing but spirits of nitre in it, and that is sold by every chemist in the town.

Mr. Paul Catterall: We will hear what you have to say afterwards; you must now confine yourself to asking questions.

Defendant (to Mr. Lane): I wrote to you to tell you that we never had methylated spirits, and I can give abundant proof of that. I travel a great deal myself, and was at Sheffield when my son told me of this affair.—Mr. Lane: I received the letter that morning.—Defendant: It is two or three months since I sent it.—Mr. Lane (in answer to Mr. Watson): It is six or seven years since he came to me. That was before the passing of this Act of 1861. The defendant had no licence to sell methylated spirits.

Mr. Wm. Harkness was next called. He deposed: I am an analytical chemist employed at Somerset House. I received, at the laboratory there, the two bottles spoken to by Mr. Lane, and which I now produce. I made an analysis of their contents. Speaking of the bottle with the label "Indian Brandee" upon it, I found that its contents consisted of 76 per cent. of methylated spirit, and that it was sweetened with treacle. There was no nitre whatever in it. Methylated spirit can be purchased at 2*s.* 9*d.* per gallon, and the bottle which Mr. Lane paid 6*s.* for contains about a pint of the mixture. Its cost would be less than 1*s.* Speaking of the bottle marked with the label "Indian Whiskee," I have analyzed its contents, and find that it contains 72 per cent. of methylated spirit, and that it is sweetened with sugar. There is not a particle of nitre in it. These liquids are rendered potable, and may be used as a beverage. In its present state and quality it is equal to strong gin, highly sweetened. I should say it is pernicious to health, through the naphtha in it. The only material difference between the brandee and the whiskee is that one is coloured and the other is not. The contents of both bottles are rendered fit for use as a beverage. They must have been flavoured, mixed, and prepared, which are prohibited by the Act. These mixtures are well known in some places and are called "the teetotaller's nightcap." They will both "cheer" and "moderately inebriate."

Defendant: You call yourself an analytical chemist, but you must be a tyro. In an important matter of this kind we must have analytical chemists on both sides. I am prepared to swear, and prove, that we have not had a gallon of methylated spirit on our premises for six or seven years. We use methylated nitre. You say there is treacle in the brandee. I deny that statement *in toto*, and I can bring you plenty of proof.

Mr. Peter Catterall: Confine yourself to asking questions now. We will hear your statement by-and-by.

Defendant: He has just now said it is treacled and flavoured; before he said it was treacle and methylated spirit. There is not a drop of methylated spirit in it except what there is in methylated nitre.—(To Mr. Harkness): Do you say there is no methylated nitre in it?—Mr. Harkness: There is not a particle.—Defendant: I suppose you are aware that these articles are sold up and down?—Mr. Harkness: They are to a great extent.—Defendant: That's very true. I suppose you are aware that several chemists have been called up by the Excise authorities?—Mr. Harkness: Several have been called up for selling without a licence.—Defendant: I was off, and knew nothing at all about these matters. The person who brought the summons said that I had better go and settle it. I was not aware of having done anything wrong. (To Mr Harkness): What did you say the whiskee was made of?—Mr. Harkness: Methylated spirit, sweetened with sugar; or, if you would have it plainer, methylated spirit, water, and sugar.—Defendant: Is there any quinine in it?—Mr. Harkness: I cannot say. I did not test it for quinine, though I can do so here in five minutes, if you wish.—Defendant: Quinine costs a great deal a pound. There are spirits of nitre, paregoric, and tincture of rhubarb, and none of them can be made without spirit.—Mr. Harkness (to Mr. Peter Catterall): If you purchase methylated spirit you get it about 60 per cent. over proof. In this case it has been reduced to 28 under proof. It would kill any one to drink strong methylated spirit. In this instance the strength of the methylated spirit has been reduced by water and sugar.—Defendant: You say that methylated spirit is only 2*s.* 9*d.* a gallon, but it is more. From what I have been told, it is 4*s.* a gallon, but I have not had any myself for years.—Mr. Harkness: I speak from a printed list of prices which I hold in my hand.—Defendant: Well, we are not in the habit of buying it, and I can prove that abundantly. You say the brandee was flavoured, but you did not say what it was flavoured with.—Mr. Harkness: Sugar or treacle is the flavour. I said it was treacle that the brandee contained, but it may have been dark brown sugar. I called it treacle because it resembles that more than any other thing.—Defendant: You said it was coloured, but that is a mistake. It is not coloured at all.—Mr. Harkness: It is here for any one to see that it is coloured.—Defendant: I am prepared to prove that there is no methylated spirit in it.

Mr. Watson: That is the case.

The defendant again denied his having had any methylated spirit on his premises for the last six or seven years, and repeated that his "Brandee" was made from *methylated nitre;* he wished for a remand, that he might prove what he had stated; but this the Court refused, seeing the defendant had had ten days' notice for the purpose of being prepared with a defence, and yet had not called a single witness.

After a short consultation the Bench decided that the case was proved, and inflicted a fine of £12. 10*s.* on the first case, and £25 on the second case, but they were willing to recommend that the second penalty be reduced to one-half. The recommendation of the Bench was accordingly conveyed to the authorities at Somerset House, and the proceedings terminated.

EXTRACTS FROM MINUTES OF EVIDENCE GIVEN BEFORE THE SELECT COMMITTEE ON THE CHEMISTS AND DRUGGISTS BILL.

(*Continued from page 72.*)

Mr. John Simon, examined.

Chairman.] 374. You heard the evidence given by Dr. Taylor?—I heard a great part of it.

375. Do you agree in the opinion he has given as to the necessity of legislation, and the suggestions he has given to the Committee?—I think it very expedient, and indeed necessary for the public safety, that there should be some sort of legislation; and expedient the legislation should be mainly in the direction that he has suggested I cannot say legislation is equally necessary on all points.

Sir Fitzroy Kelly.] 388. Would you for a moment lay aside the question of the sale of poisons, and tell the Committee, whether in your opinion, as a result of your experience, you think the public require protection against incompetence and ignorance in chemists and druggists in the case of making up medical prescriptions ?—Against ignorance in that particular direction the public does not, I think, require protection so much as against carelessness; but, in one respect (that, I think, Dr. Taylor did not advert to), it is of great importance to the public that pharmacists should be well educated in their business. I admit that the highest quality of pharmaceutical knowledge can hardly be expected to be obtained universally throughout the country; but, nevertheless, it is most desirable for the public that the pharmacist should be competent to examine chemically the drugs and preparations which he sells, so as to know whether (through adulteration or otherwise) they are below their standard strength, and so forth. I think the absence of that knowledge leads to inefficiency in the making up of prescriptions, and to much needless uncertainty in medical practice; for some very important medicines may be greatly stronger in some shops than in others. This want of uniformity is a serious practical evil.

389. The question I meant to ask you was, whether you think it necessary for the safety of the public, that chemists and druggists in general hereafter should be permitted to make up prescriptions indiscriminately; that they should be subject to some examination as to fitness and as to knowledge ?—I think it desirable, as part of a general system.

390. Do you think there would be any difficulty in framing the kind of examination, and appointing competent examiners to conduct these examinations in the case of chemists and druggists before they should be considered entitled, in the way of trade, to make up the prescriptions of medical men ?—I think there would be no great difficulty in that; indeed, some of the difficulty I have heard adverted to to-day might be met by giving to the authority that regulated the examination a power for relaxing conditions in respect of certain thinly populated districts.

391. Without entering into details, you think it is desirable to legislate on the subject ?—Yes.

392. At present, you are aware there is no restriction whatever by law on chemists and druggists for carrying on their business, both in the making up of prescriptions as well as in the sale of poisons; but you think, with regard to the making up of prescriptions (I will trouble you with a question about poisons afterwards), it is desirable to legislate, in order to secure the public against the consequences of ignorant and incompetent people carrying on this business ?—As part of a system, yes.

Dr. RICHARD QUAIN, examined.

Chairman.] 415. You are a Doctor of Medicine, I believe, and one of the Members of the Medical Council ?—Yes.

416. One of the Members appointed by the Crown ?—Yes.

417. Have you directed your attention to the qualification of chemists and druggists ?—Yes.

418. Do you consider that some examination is necessary with respect to persons who deal in drugs, or in certain classes of drugs ?—Yes; I joined in a recommendation to the Home Secretary to that effect by the Medical Council.

419. Will you state the grounds of your opinion ?—It was felt to be important, that chemists and druggists who had to deal with matters that may be dangerous to life, either from ignorance or carelessness, should be under some control and be required to give evidence of their competence to deal with drugs and chemicals.

420. And when you say chemists and druggists should be submitted to such a test, where would you draw a line with regard to chemists and druggists; would you oblige any one who dealt in any sort of drug in retail to pass an examination, or would you draw a line ?—I should think there might be a difference in the character of the examination, but all persons who deal in poisons should know the properties of such poisons.

421. In respect of drugs not poisonous ?—With regard to dealing in them, I think

it is not a matter of importance. With regard to compounding drugs, such persons ought to be fully acquainted with their properties and doses.

422. In the first place, you would require some examination in respect of persons dealing with poisonous drugs?—Quite so. I should think they ought to know the properties of them. I should require a more careful and rigid examination of those who mix and compound medicines.

423. Compounding drugs would include mixing prescriptions?—All compounding. It would be difficult to draw a line at the compounding merely of prescriptions. I would like to say, with regard to one point (the mere fact of danger to life), that, besides great value to be attached to the education of chemists and druggists, who supply physicians with the agencies by which they treat disease, and who, when educated, are better capable of understanding the nature of drugs than they would be if ignorant, they would supply physicians and surgeons with far better agencies than we could obtain if they were uneducated and ignorant. Pharmacy has so much improved in the present day that drugs are better and more efficient than they were.

424. That being so, what would be the kind of examination you would recommend? —My answer would very much depend on the question, whether all persons should be registered. If the law were made so stringent, that nobody could compound medicine unless registered, it strikes me that the examination should be moderate.

425. Embracing what?—Chiefly the knowledge of the properties of drugs, and the capability of reading ordinary Latin prescripttons. There might be a higher examination for a higher class who might wish to undergo it. If it be made compulsory on all to pass an examination, and be registered, there ought to be great facilities for doing so.

426. That would be as far as the law would go, I presume?—Quite.

427. The nature of the examination being such as you have pointed out, whom would you recommend as an examining body to carry out such a system?—I know none better than the Pharmaceutical Society with its Minor examination, which is sufficient, if not more than it need be, for the class of which I speak. I should not allow it to remain wholly in the hands of the Society without some control from Government; this power might become a great monopoly if allowed to be in the hands of any society or any corporate body. There ought to be direct control from the Secretary of State or the Privy Council, as to the character of the examination and the fees.

428. When you use the words "some control," would you recommend that the Crown should have the power of appointing persons to belong to the Council as examiners, or in what manner?—An assessor, who would be present at the examination, and the regulations should be submitted to and approved by the Home Secretary from time to time.

429. Or the Privy Council?—Certainly; the assessor would not take an active part, but would merely attend for the purpose of supervision.

430. If such an examination was to be required, you would place it in the hands of the Pharmaceutical Society, with certain alterations to make it more general?—There should be no difficulty whatever in admitting to the Minor examination in regard to compounding and dispensing medicines.

431. Are you apprehensive, from the passing of some measure which would require a greater education of chemists and druggists, that it would raise the character of the class and interfere with the medical profession?—I do not think so; a better class would attend more closely to their own business.

432. Do you think it necessary or desirable to prohibit chemists and druggists from giving advice to persons who come into their shops?—With regard to that, it may seem hard to place a restriction on chemists and druggists to which other people are not subjected; but a "doctor's shop" is a familiar place to which to go for advice, and hence there is a temptation to the public to go to those shops, and it is done to a great extent in poor neighbourhoods and manufacturing districts. I think a clause should prohibit chemists and druggists from being systematically engaged in the treatment of diseases or injuries, or from practising as medical men.

433. It would be difficult to prove a person was systematically engaged?—It is difficult to prove most things. It would be thus: a person must not come day after

day for advice; but if he wanted a dose of physic, it would be a difficult thing to prevent his getting it in a chemist's shop.

Mr. Roebuck.] 434. If he came Monday, he might not go Tuesday?—He might not go daily and systematically.

Mr. Ayrton.] 435. He must not go until he is cured?—Well——or——

Lord Elcho.] 436. You have said such a clause would be extremely useful; to whom?—To the public.

437. Why?—Because it would prevent many of them being carried on in the *quasi* treatment of their diseases, till the diseases became serious.

438. It would be likewise useful to the medical profession?—I have more sympathy with the public in respect to their diseases.

439. You do not wish that as a medical practitioner?—Not in that capacity alone.

Sir Fitzroy Kelly.] 440. I think you have had great experience in the practice of your profession for a great many years; how many years have you been a member of the profession?—Nearly thirty-five years.

441. You are aware now, I suppose, by law there is no restriction whatever on anybody whomsoever exercising the trade of a chemist and druggist?—Quite so.

442. Making up medical prescriptions in all cases?—Quite so.

443. Dealing in poisons of every description, without any species of limit, anybody may do that without any qualification whatever?—Quite so.

444. However incompetent, however ignorant?—Yes.

445. Then I will ask you first, in your opinion, and founded on your long experience, do you think that legislation is necessary in order to impose the necessity of some qualification, by means of an examination, before persons shall be permitted thus unlimitedly to exercise that trade?—I think it is necessary.

446. Do you think it necessary, with respect merely to the medical profession, or any particular class, or generally for the safety of the public?—I think, generally, for the safety and advantage of the public.

447. You have alluded to some resolution or recommendation which was made by the Medical Council upon this subject; would you just cast your eye over that, and tell me if that is the recommendation (*handing a Paper to the Witness*)?—Yes.

448. "Nothing exists at present to prevent any person commencing business as a chemist and druggist, or publicly vending drugs or compounding medicines; the necessity for legislation on the subject is expressed in a resolution of the Medical Council, as follows:" this is the resolution of the Medical Council to which you alluded?—Yes.

449. "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?"——

Mr. Roebuck.] 450. Is that a report?—That is a special communication sent from the Medical Council to the Home Secretary. It was made in 1864.

Sir Fitzroy Kelly.] 451. And since that there has been no legislation on the subject?—None.

452. Now, you have said that the examination should be of as moderate a character as possible, consistently with the object to be attained, the safety of the public; would you allow me to ask you whether you are acquainted with what is called the Minor examination adopted by the Pharmaceutical Society?—Yes; I have read the programme of it.

453. We shall have the details presently; but I will, as we go along, ask you whether that embraces, first, the ability to read medical prescriptions?—It does.

454. Of all kinds that are taken to chemists and druggists for the compounding of medicines?—All prescriptions written in Latin.

Sir John Shelley.] 455. And English?—But not French or German.

To be continued.)

CHEMICAL DISCUSSION ASSOCIATION OF THE PHARMACEUTICAL SOCIETY.

REPORT OF THE COMMITTEE TO THE ANNIVERSARY MEETING, 22ND JANUARY, 1866.

At the last anniversary meeting of the Association the committee had occasion to congratulate the members upon the number and character of the communications that had been received during the session; it is their pleasing duty again to speak in high terms of the observations and discoveries reports of which have been presented at the meetings, at the same time they cannot help noticing with regret the greatly diminished attendance of the general body of the members. They trust, however, that during the year that is commenced, such accession may be made to their numbers as may compensate for those of whose co-operation the association is deprived by business engagements or removal.

The treasurer's accounts show a balance in hand of £5. 19*s*. 3*d*.; and as it has been thought unnecessary to maintain the subscription at the present rate, it is now reduced from five shillings to two shillings and sixpence per annum.

The following is a summary of all the communications that have been received during the past year, and of which some have since appeared in the 'Pharmaceutical Journal':—

Feb. 6th, 1865. "On the Phosphate of Ammonia, Ph. Br.," by Mr. J. Watts, Senior Bell Scholar. Published in the Pharm. Journ. vol. vi. p. 507.

A curious experiment was exhibited by Mr. J. Broughton, B. Sc. When dry ammoniacal gas is passed into solution of iodine in absolute alcohol containing some bisulphide of carbon, the colour of the iodine gradually disappears, and as the gas continues to pass the solution becomes tinted of a fine purple colour, which, however, is extremely fugitive and disappears in a few minutes. The presence of a very small quantity of water is found entirely to prevent this reaction.

March 6th, 1865. "On Resin of Jalap," by Mr. A. F. Haselden. Published in Pharm. Journ., vol. vi. p. 563.

April 3rd, 1865. Dr. Attfield exhibited a specimen of cane sugar which had been deposited from some Linimentum Belladonnæ, Ph. Br.

A paper was read "On Phosphoric Acid of Different Densities," by Mr. J. Watts. Published in the Report of the British Pharmaceutical Conference, and in Pharm. Journ. vol. vii. p. 191.

May 1st, 1865. "On some Rare Essential Oils," by Mr. C. Umney. The author described the volatile oil of Buchu, which was found to consist of a fluid oil and a crystalline stearoptene. Of the former, 1·4 per cent. had been obtained; of the latter, ·5 per cent. The volatile oil of cascarilla had also been examined. 1·2 per cent. had been procured from cascarilla bark, and it was found to have a specific gravity of ·917, not ·938, as stated in Pereira's 'Materia Medica.'

"Note on Sp. Ammon. Aromat. Meth.," by Mr. C. Umney.

June 12th, 1865. Some remarks upon the British Pharmacopœia test for chloroform were made by Mr. C. H. Wood. He had found, in spite of objections that had been raised against the potassium test, and although chloroform apparently quite pure usually evolves a trifling amount of gas when treated by that method, yet for practical purposes the test might safely be made use of.

A paper was afterwards read "On the Spectrum of Polarized Light," by Mr. A. Waugh, illustrated by apparatus constructed by the author. A polarized ray which has been made to pass through a plate of selenite, and is examined by the aid of a Nichol's prism, presents certain dark bands in the spectrum. Such bands are found to appear and disappear in complementary portions of the spectrum on rotating the analyzer, and vary in number and character according to the thickness of the selenite and its inclination to the plane of polarization. Upon introducing a second selenite plate into the path of the polarized ray, the spectrum is still crossed by dark bands, which, upon rotating the analyzer, instead of being stationary throughout and merely appearing and disappearing, move along the spectrum, the amount of motion and its direction depending upon the position of the second selenite, the direction being reversed through each quadrant of the revolution, and the motion ceasing at the completion of each quadrant. The above phenomena were accounted for by the author by supposing the ultimate action of the selenite to consist in the division of the polarized ray into two portions, each circularly polarized, the one in a direction opposite to that of the other.

November 6th, 1865. "On the Reduction of Chloride of Silver," by Mr. J. Robbins. The author proposed, as an improvement upon the methods ordinarily in use, to dissolve the chloride in ammonia, and having introduced some strips of copper, to apply heat. The whole of the silver is speedily deposited in the state of a fine metallic powder.

"On the Physics of Filtration," by Dr. J. Attfield. Published in the Pharm. Journ. vol. vii. p. 355.

December 4th, 1865. The Secretary exhibited a lecture experiment which had been described in the 'Chemical News' of Nov. 17th, by Krant.

Specimens of Cod-Liver Extract, Pill Mass, and Dragées, or coated pills prepared therefrom, were shown.

Mr. Tilden also exhibited specimens of two new Salts of Urea, the one Tartrate of Urea and Potassium, the other Tartrate of Urea and Sodium.

THE WAY TO MAKE A LIST OF MEMBERS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The unreliable nature of the returns of Members of the so-called United Society, and of the number paraded before the Committee of the House of Commons last session, will, I have no doubt, now be made apparent throughout the length and breadth of the kingdom; but so flagrant an instance of neglect in preparing the returns could scarcely again be met with as occurred in my own case. I therefore communicate it to your readers, as well as to the members of the Society in question through the medium of the 'Chemist and Druggist.'

Some four or five years since, Mr. Buott was in Bath, and, amongst others, called upon me to solicit a subscription of five shillings to the Society, which, as I then understood him, was chiefly established for benevolent purposes, and in no way to oppose the Pharmaceutical. At first I declined to subscribe, but his persistence, on calling a second time, induced me at last to give him the required five shillings. Some time after this, observing the action of this Society and its Secretary to be very contrary to my wishes, I wrote declining further connection with it, and requested my name to be removed from the list of members. Notwithstanding this and the non-payment of subscription for at least three years, on looking over the list lately published, I find my name is still retained. A circular has also been addressed to me, signed C. Buott, "expressing his assurance that my desire to support the cause of the Society is such, that it is only needful for him to remind me that my subscription for 1865 remains unpaid," etc. etc.

Now, Sir, considering that at least three other years also remained unpaid, the quiet obliviousness of this cunningly conceived appeal is to my mind exceedingly rich, and deserving a passing notice.

In conclusion, I may add that the names of two other chemists in this city, who have each only paid one subscription some years since, also appear in the present list, and that one, if not both, have declined to renew the connection.

I am, Sir, yours, etc.,

Bath, January 25, 1866. H. J. WALKER.

THE LATE SIR WILLIAM HOOKER.

The following paragraphs form the concluding portion of a very able notice of the labours of the late Sir William Hooker, which has recently appeared in Silliman's 'American Journal of Science and Art.' The author (Dr. Asa Gray), from his intimate knowledge of and associations with our late eminent botanist, and being an American, is peculiarly well adapted to form an unprejudiced opinion:—

"Our survey of what Sir William Hooker did for science would be incomplete indeed, if it were confined to his published works—numerous and important as they are—and to the wise and efficient administration, through which, in the short space of twenty-four years, a Queen's flower and kitchen garden and pleasure grounds have been transformed into an imperial botanical establishment of unrivalled interest and value. Account should be taken of the spirit in which he worked, of the researches and explorations he promoted, of the aid and encouragement he extended to his fellow-labourers, especially to young and rising botanists, and of the means and appliances he gathered for their use no less than for his own.

"The single-mindedness with which he gave himself to his scientific work, and the conscientiousness with which he lived *for* science while he lived *by* it, were above all praise. Eminently fitted to shine in society, remarkably good-looking, and of the most pleasing address, frank, cordial, and withal of a very genial disposition, he never dissipated his time and energies in the rounds of fashionable life, but ever avoided the social prominence and worldly distinctions which some sedulously seek. So that—however it may or ought to be regarded in a country where Court honours and Government rewards have a factitious importance—we count it a high compliment to his sense and modesty that no such distinctions were ever conferred upon him, in recognition of all that he accomplished at Kew.

"Nor was there in him, while standing in a position like that occupied by Banks and Smith in his early days, the least manifestation of a tendency to overshadow the science with his own importance, or of indifference to its general advancement. Far from monopolizing even the choicest botanical materials which large expenditure of time, and toil, and money brought into his hands, he delighted in setting other botanists to work upon whatever portion they wished to elaborate; not only imparting freely, even to comparatively young and untried men of promise, the multitude of specimens he could distribute, and giving to all comers free access to his whole herbarium, but sending portions of it to distant investigators, so long as this could be done without too great detriment or inconvenience. He not only watched for opportunities of attaching botanists to Government expeditions and voyages, and secured the publication of their results, but also largely assisted many private collectors, whose fullest sets are among the treasures of far the richest herbarium ever accumulated in one man's lifetime, if not the amplest anywhere in existence.

"One of the later and not least important services which Sir William Hooker has rendered to Botany, is the inauguration, through his recommendation and influence, of a plan for the publication, under Government patronage, of the Floras of the different British colonies and possessions, scattered over every part of the world. Some of these (that of Hongkong and that of the British West Indies) are already completed; others (like that of Australia, and the Cape Flora of Harvey and Sonder, adopted into the series), are in course of publication; and still others are ready to be commenced.

"The free and cordial way in which Hooker worked in conjunction with others is partly seen in the various names which are associated with his in authorship. This came in part from the wide range of subjects over which his survey extended, a range which must have contributed much to the breadth of his views and the sureness of his judgment. Invaluable as such extent of study is, in the present state and prospects of our science, we can hardly expect to see again a botanist so widely and so well acquainted both with cryptogamic and phanerogamic botany, or one capable of doing so much for the advancement and illustration of both.

"Our narrative of Sir William Hooker's scientific career and our estimate of his influence has, we trust, clearly, though incidentally, informed our readers what manner of man he was. To the wide circle of botanists in which he has so long filled so conspicuous a place, to his surviving American friends and correspondents, some of whom have known him long and well,—and 'none knew him but to love him, nor named him but to praise;' it is superfluous to say that Sir William Hooker was one of the most admirable of men, a model Christian gentleman."

Obituary.

Died, at Darlington, December 3, 1865, Thomas Bonner Teasdale, Pharmaceutical Chemist, aged forty-four years.

Died, at Edinburgh, December 24, 1865, in the fifty-second year of his age, John Pilley, Pharmaceutical Chemist.

REVIEWS.

A Catalogue of Surgeons' Instruments and Appliances; also of the Apparatus, Implements, Utensils, and other requisites employed in Pharmacy, the Dispensing of Medicines, etc. Medical Glass and Earthenware, Medicine Chests, Show Cases, Proprietary Articles, Perfumery, and Druggists' Sundries of all kinds. Manufactured and sold by S. Maw and Son, 11, Aldersgate Street, London. 1866.

Great credit is due to Messrs. Maw and Son for the very admirable manner in which their Catalogue has been brought out. Both paper and printing leave nothing to be desired; and the Illustrations are executed with much skill. The Catalogue, which extends over 293 pages, is arranged in three divisions:—

Part 1 comprehends Surgeons' instruments and appliances, together with instruments for Veterinary purposes.

Part 2, the apparatus, implements, utensils, etc., employed in Pharmacy.

Part 3, an illustrated list of shop cabinet furniture, etc. etc.

Domestic Medicines, their Uses and Doses, in the Absence of Professional Assistance; with Tables of Weights and Measures; the preparation of Beverages Suitable for the Sick Room; Poisons and their Antidotes. Fisher and Haselden. (Second Edition.) London: Robert Hardwicke, 192, Piccadilly, and all Booksellers. 1865.

This is a very useful little companion to a medicine chest, or as a source of information in cases of emergency, in the absence of professional assistance. The directions are concise and clearly given.

The Autographic Mirror. (L'Autographe Cosmopolite.) Saturday, January 13, 1866. New Series. No. 29. London: Alfred Ive, 13, Burleigh Street, Strand.

All pharmaceutists, and indeed every one interested in the progress of pharmacy in this country, will be pleased to know that this number contains an interesting notice of our late lamented President, Jacob Bell, together with two autographic letters illustrated by some humorous original pen-and-ink sketches. The editor remarks that "the letters and sketches we give represent Jacob Bell in a new character—that of a humourist, full of congeniality both as a writer and a caricaturist." And he also remarks, "We are told that the railway mania is coming again; if so, the publication of his 'Maxims for the Guidance of Railway Speculators, to Preserve them from Burning their Fingers,' will be very welcome. 'Prevention is better than Cure,' as Jacob Bell says." We recommend all our readers to obtain a copy of this number.

BOOKS RECEIVED.

Further Observations on the Vegetable Parasites, particularly those infesting the Human Skin. By Jabez Hogg, F.L.S., etc. With Plates.

The Half-Yearly Abstract of Medical Science—July to December, 1865. Churchill.

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 of 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.

R. C. (Yorkshire).—Fownes's 'Manual of Chemistry,' price 12*s.* 6*d.*; Bentley's 'Manual of Botany,' price 12*s.* 6*d.*; Pereira's 'Manual of Materia Medica,' by Farre, Bentley, and Warington, price £1. 1*s.*; 'British Pharmacopœia,' price 6*s.* 6*d.*; Squire's 'Companion to the British Pharmacopœia,' price 8*s.* 6*d.*

Associate (Brighton).—See paper by Professor Bentley 'On Sarracenia purpurea,' in the 'Pharmaceutical Journal,' vol. iii. 2nd series.

Sigma (Macclesfield).—The label in question is liable to the stamp duty.

M. D. (Shrewsbury).—We are unable to give any information as to the agent referred to.

A Manchester Assistant.—We are not surprised at the result. The addition of oil of pimento to citrine ointment would infallibly spoil the latter.

T. W.—Apply by letter to the Secretary, 17, Bloomsbury Square, giving name and address, with the particulars of the case referred to.

A. (Kensington).—*Syrupus Quinæ Iodidi.* See page 392.

R. H. (Alderley).—*Ess. Rhei Dulc.* Probably the following formula for *Extractum Rhei Fluidum*, U. S., would give a satisfactory result; and the Senna might be prepared in a similar way:—Take rhubarb, in moderately fine powder, 16 oz. troy; sugar, in coarse powder, 8 oz. troy; alcohol, a pint; diluted alcohol, q. s. Moisten the rhubarb with 4 oz. of the alcohol, introduce it into a conical percolator, press it gently, and pour upon it the remainder of the alcohol. When the liquid has disappeared from the surface, gradually pour on diluted alcohol until a pint of tincture has passed. Set this aside in a warm place until reduced by spontaneous evaporation to 6 fl. oz., and continue the percolation until 2 pints more of the tincture have been obtained. Evaporate this by gentle heat to 6 fl. oz., then add the sugar, and, when this has dissolved, add the reserved tincture, and continue the heat until the whole is reduced to the measure of a pint.

J. W. G.—We can give no opinion as to "business prospects" in the colonies.

M. P. S. is thanked for the specimen forwarded.

Innocens.—The term *terchloride of carbon* has been incorrectly applied to chloric ether.

N. B. wishes for a formula for "Liq. Ferri et Quinæ Peracetatis." The following is a formula for *Syrupus Ferri Hypophosphatis*:—

Take Ferri Sulph. 1oz.
Sodæ Carbonatis, 1½ oz.
Acid. Hypophosph., 6 oz.
Acid. Phosph. Dil., 1 oz.
Aqua Destillat., q. s.
Sacchar. Alb., 12 oz.
Product 16 oz.

Dissolve the sulphate of iron and carbonate of soda in separate quantities of water; mix the solutions, and collect the precipitate; then dissolve it in the acids; lastly add the sugar.

R. L. C.—Bentley's 'Manual of Botany' and Pereira's 'Manual of Materia Medica' will be sufficient for your purpose.

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, Bloomsbury Square.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VII.—No. IX.—MARCH 1st, 1866.

PHARMACEUTICAL WEIGHTS AND MEASURES FROM A PRACTICAL POINT OF VIEW.

In the last number of this Journal, at page 407, we inserted some remarks, by Professor Guibourt, of Paris, on the subject of English pharmaceutical weights and measures. After a reference to the different systems of weights and measures that have been employed and authoritatively ordered for the preparation of medicines in this country during the last forty years, the professor states what he thinks would have been the proper remedy for the sources of error existing while two or more systems of weights were used and sanctioned by the colleges in different parts of the country. He would either have taken the avoirdupois pound, as originally established, with its subdivisions of 16 ounces, 128 drachms, 384 scruples, and 9216 grains, and have regulated both weights and measures by this scale, or, what he thinks would have been preferable, he would have resolutely abolished the avoirdupois weights, and have adopted, for all purposes, a pound of 12 ounces troy, or a pound of 16 ounces troy. Having thus explained what he conceives would have been the proper remedy for the evils existing when there were different systems of weights in use, those used in the preparation and dispensing of medicines differing from those used for the ordinary purposes of commerce, he proceeds to criticize the system adopted in the British Pharmacopœia of 1864. He says, "They have adopted as the medicinal pound the avoirdupois pound of 7000 grains troy; but not being able to divide this pound into ounces, drachms, and scruples, containing exact numbers of grains, they have wished to be able to suppress the three intermediate denominations, and to set up a ponderal system, composed only of a pound and grains. But recoiling, doubtless, from the practical impossibility of such an attempt, they have admitted an ounce of 437·5 grains. They have, however, suppressed, in their scale of weights (though not in that of measures), the drachm and the scruple, for a reason which ought to have caused the disappearance of the ounce likewise; and that is, because it is impossible for those units to be at once exact multiples of the grain and integral parts of the pound."

It cannot be denied that there is some ground for the criticism implied in these remarks, but we think it will hardly be admitted by those who are familiar with the customs and requirements of Englishmen that either of the alternatives suggested for the alteration made by the authors of the British Pharmacopœia would have proved a practicable remedy for the evils previously existing. Any attempt now to substitute for the avoirdupois pound a pound of 12 ounces or of 16 ounces troy, for the general purposes of commerce, would have proved abortive. The avoirdupois pound, with its subdivisions and multiples, are established in use throughout the whole of this kingdom, and the values of these weights are as clearly defined and well regulated by law as are the weights used in any other country. Our measures also have a simple relationship to the avoirdupois weights, and one could not properly be altered without altering the other. These weights and measures are fully applicable for all the ordinary purposes of commerce, but as the subdivisions of the avoirdupois pound do not extend below the sixteenth part of the ounce, or avoirdupois drachm, this weight is inapplicable either for dispensing medicines or for selling precious stones and other costly articles. Hence the legislature, in such cases, allows the substitution, in the one case, of apothecaries' weight, and in the other, of troy weight. If, in establishing what are now called the imperial weights in this country, the avoirdupois pound had been divided, as it appears originally to have been, into ounces, drachms, scruples, and grains, making the drachm $\frac{1}{8}$ part of the ounce, and the scruple $\frac{1}{3}$ part of the drachm, but making the grain $\frac{1}{20}$ part, instead of $\frac{1}{24}$ part as formerly, of the scruple, we should have had a system of weights which would have been applicable to all purposes, and would have rendered it unnecessary to sanction the use of any others. The only inconvenience attending the adoption of such an arrangement would have been that the legally-recognized grain would have been slightly reduced in weight. It will be recollected by some of our readers that a proposition to adopt such a division of the avoirdupois ounce for use in medicine was made some years ago by Dr. Wilson, of Edinburgh, and this proposition was so favourably entertained at one time by the Medical Council, that they determined to adopt that system of weights in the British Pharmacopœia, but this determination was afterwards altered. It is certainly to be regretted that in the weights now ordered to be used in medicine there is not a simple relationship between the grain and ounce, and that there are no intermediate denominations of weight between those two. In prescribing, the scruple of 20 grains, and the drachm of 60 grains, are still used, and will no doubt continue to be so, and it is here that the drachm and scruple are most required. With reference to the formulæ given in the Pharmacopœia for the preparation of medicines, there are a few cases in which the adjustment of the proportions of the ingredients used might perhaps have been effected rather more conveniently if the grain had been an integral part of the ounce, and there is certainly some apparent awkwardness in the formulæ quoted by Professor Guibourt; but it must be recollected that sets of grain weights are commonly kept from 10,000 grains downwards, divided decimally, and these are easily applied in cases such as the Professor refers to.

But not only does Professor Guibourt object to the weights used in the British Pharmacopœia, he appears still more strongly to object to our use of measures,—not of the particular measures ordered, but of any measures. He says, "in my opinion, no instrument is comparable to a balance for determining exactly the quantity of a liquid, and I highly approve the directions of the later Prussian Pharmacopœias in not allowing the measuring of liquids." It is well known that in France the measure-glass is hardly ever used in pharmacy. In dispensing, as well as preparing medicines, liquids are weighed and not measured. In some cases there is no doubt that greater accuracy may be attained by the use of the balance than of the measure-glass; thus, for instance, in the preparation of the diluted mineral acids, the quantities would be better adjusted by weighing than by measuring the strong acids; but for the general purposes of dispensing or mixing liquid medicines, we doubt if the French system has any advantage over that adopted in this country. The French pharmacien, in dispensing a mixture, begins by putting the bottle into a balance, and counterpoising it; then he weighs the liquids in the bottle, adding them one after the other, but he has obviously no means of withdrawing any portion from the bottle (excepting of that which is first introduced) if he happens to pour in too much. For the sort of medicines usually prescribed in France this method of dispensing may probably do very well, but in this country we do not think it would conduce to accuracy, or be at all compatible with the dispatch of business required at our dispensing establishments.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *7th February*, 1866,

Present—Messrs. Bottle, Brady, Davenport, Deane, George Edwards, Hanbury, Haselden, Hills, Morson, Orridge, Randall, Sandford, Savage, Squire, and Waugh,

The following were elected

MEMBERS.

Coventry	Powers, Edward.
London	Barrett, James.
"	Young, William.
Newbury	Hickman, William.
Torquay	Miller, Thomas Henry.
"	Millar, Fredk. Chas. Moss.

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.
Davenport, John Thistlewood, 33, Great Russell Street, Bloomsbury.
Deane, Henry, Clapham.
Edwards, George, Dartford.
Hanbury, Daniel Bell, Plough Court, Lombard Street.
Hills, Thomas Hyde, 338, Oxford Street.
Mackay, John, 121, George Street, Edinburgh.
Morson, Thomas N. R., 38, Queen Square, Bloomsbury.
Orridge, Benjamin B., 30, Bucklersbury.
Sandford, George Webb, 47, Piccadilly.
Savage, William Dawson, 65, Edward Street, Brighton.
Squire, Peter, 277, Oxford Street.
Watts, William Manning, 32, Lower Whitecross Street.
Waugh, George, 177, Regent Street.

The following Members remain in office for the ensuing year:—

Bottle, Alexander, 37, Townwall Street, Dover.
Brady, Henry B., 40, Mosley Street, Newcastle-on-Tyne.
Edwards, John Baker, Royal Institution, Liverpool.
Evans, Henry Sugden, 56, Hanover Street, Liverpool.

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* Bye-laws, sect. 5, clause 3:—Any Member of the Society desirous of nominating another Member for election as a Member of the Council, or as an Auditor, shall give notice in writing, with the name and address of the candidate, to the Secretary of the Society on or before the 24th March in every year.

HASELDEN, ADOLPHUS F., 18, Conduit Street.
RANDALL, WILLIAM BRODRIEB, 146, High Street, Southampton.
STANDRING, THOMAS, 1, Piccadilly, Manchester.

EXAMINATION, 21*st February*, 1866.

MAJOR (Registered as Pharmaceutical Chemists).

Chubb, Osborn ....Taunton.
Cruse, Thomas Harris ....Warminster.
Dyson, Walter ....Pendleton.
Horton, Arthur Thomas ....Scarborough.
Jones, Edward..Ryde.

MINOR (Registered as Assistants).

Agnew, Ernest James ....Southsea.
Baines, William Duckle...............................London.
Blackwell, Frederick ....Lyme Regis.
Dumolo, John Thomas ....Birmingham.
Evans, Richard Morgan........ ....Tredegar.
Farries, Thomas ....Driffield.
Hodgson, William Henry ....London.
Newbould, Thomas Alexander ....Bradford, Yorkshire.
Pasnin, Thomy ....Mauritius.
Yates, Robert ....London.

REGISTERED APPRENTICES.

NAME.	RESIDING WITH	ADDRESS.
Baker, William Horsman	Mr. Alpass	Liverpool.
Childs, Charles John	Mr. Allchin	Barnsbury.
Hale, Albert Henry	Mr. Johnson	London.
Lindsay, George William	Mr. Nicholson	Sunderland.
Neale, William James	Mr. Langford	King's Lynn.
Pilley, Henry Thomas	Messrs. Tomlinson and Hayward	Lincoln.
Sharp, John James	Messrs. Proctor and Son	Newcastle-on-Tyne.
Stevens, Edmund M.	Mr. Peak	Walmer.
Strongitharm, Wm. George	Mr. Hipkins	Birmingham.
Wallis, John Thomas Ward	Mr. Ekin	Grantham.
Yeats, Thomas Flasby	Messrs. Lynch and Bateman	Manchester.

EXAMINATION IN EDINBURGH, 14*th February*, 1866.

MAJOR (Registered as Pharmaceutical Chemists).

Bulmer, Thomas Fitzgerald ....Preston.
MacInnes, Andrew....................................Ardrossan.
Stewart, James ....Kirkcaldy.

MINOR (Registered as an Assistant).

Redford, Edward A. ....Edinburgh.

REGISTERED APPRENTICE.

NAME.	RESIDING WITH	ADDRESS.
Bryden, John	Messrs. Macfarlan and Co.	Edinburgh.

ERRATUM.—Page 397, *for* Owen, Wm. Hurdon, *read* Oliver, Wm. Hurdon.

BENEVOLENT FUND.

SUBSCRIPTIONS RECEIVED DURING JANUARY AND FEBRUARY :—

London.

	£	s.	d.
Anderson, C., Lower Belgrave St.	1	1	0
Applegate, E., Upper Holloway	0	10	6
Argles, Chas., Leadenhall St.	1	1	0
Attwood and Hugill, Cannon St.	2	2	0
Barron, Harvey, Becket, and Simpson, Giltspur Street	2	2	0
Barron, Fredk., 2, Bush Lane	2	2	0
Bentley, R., 17, Bloomsbury Sq.	1	1	0
Binge, Thomas, Pimlico	0	10	6
Bird, W. L., Castle Street	1	1	0
Blake, Charles T., 47, Piccadilly	1	1	0
Bourdas, Isaiah, 10, Pont Street	1	1	0
Bower, W., 96, Tottenham Court Road	0	10	6
Buckle, C. F., Gray's Inn Road	0	10	6
Burgoyne and Burbidge, 16, Coleman Street	2	2	0
Butt, E. N., 235, Oxford Street	0	10	6
Carr, Jno., 171, High Holborn	0	10	6
Cocksedge, H. B., Bucklersbury	0	5	0
Constance, E., Leadenhall St.	0	10	6
Croydon, C., 57, Wigmore Street	0	10	6
C., W. T.	0	10	6
Darby and Gosden, 140, Leadenhall Street	2	2	0
Davies, H. E., 43, Wood Street	0	10	6
Davy, Yates, and Routledge, 100, Upper Thames Street	2	2	0
Dinneford and Co., 172, New Bond Street	2	2	0
Evans, J. H., 60, Bartholomew Close	1	1	0
Fisher and Haselden, 18, Conduit Street	1	1	0
Flux, Wm., Leadenhall St.	1	1	0
Gale, Henry, Camden Town	0	10	6
Glover, George, 19, Goodge St.	1	1	0
Gristock, Thos., 42, South St.	1	1	0
Hall, Robert, 48, Wigmore St.	0	10	6
Hill and Son, Little Britain	2	2	0
Hills, Thos. H., 338, Oxford St.	1	1	0
Barnard, John ,,	0	10	6
Cornelius, R. B. ,,	0	5	0
Dunkley, Edward ,,	0	5	0
Fletcher, John ,,	0	5	0
Gale, Samuel ,,	0	10	6
Haddock, George J. ,,	0	5	0
Hardy, Samuel C. ,,	0	5	0
Harris, Henry Wm. ,,	0	5	0
Kinch, Charles J. ,,	0	5	0
Machray, William ,,	0	5	0
Middleton, F., 338, Oxford St.	0	10	6
Provost, James Ashton	0	5	0
Tanner, Benjamin ,,	0	5	0
Wearing, Rich. H. ,,	0	5	0
Wigg, Henry John ,,	0	5	0
Wilson, Thomas ,,	0	5	0
Hanbury, D. B., Plough Court	1	1	0
Herring and Co., Aldersgate St.	2	2	0
Hodgkinson, Stead, and Tonge, 213, Upper Thames Street	2	2	0
Hooper, Bartlett, 43, King William Street, City	1	1	0
Hopkin and Williams, 5, New Cavendish Street	2	2	0
Horncastle, Jno., Stanhope Terrace, Hyde Park	0	10	6
Howden, R., Gracechurch St.	1	1	0
Howell, Thos., Camden Town	0	10	6
Humpage, B., 51, Judd Street	0	10	6
Ince, J., 26, St. George's Place	1	1	0
Jacobson, Nath., 38, Walbrook	1	1	0
Jeynes, G. W., Princess St.	0	5	0
Johnson, B. W., 70, Tottenham Court Road	0	10	6
Kemp, Robt., 205, Holloway Rd.	0	10	6
Kernot, Geo. Chas., Poplar	0	10	6
Lescher, Jos. S., 60, Bartholomew Close	1	1	0
Lidwell, J. E., Notting Hill	0	10	6
Matthews, W., 1, Wigmore St.	0	10	6
Maw and Sons, 11, Aldersgate St.	2	2	0
Morris, H., St. John's Wood	1	1	0
Mould, Saml., 21, Moorgate St.	0	10	6
Bacon, L. T., per Mr. Mould	1	1	0
Orridge, B. B., 30, Bucklersbury	1	1	0
Peppin, S. H., Prince's St., Soho	0	10	6
Pollock, Thos., 129, Fenchurch St.	1	1	0
Preston and Sons, Leadenhall St.	2	2	0
Quiller, C. R., 15, Sloane Square	0	10	6
Richardson, G., Notting Hill	0	10	6
Roach, Pope, 8, St. James's Place, Piccadilly	0	10	6
Robbins, J., 372, Oxford Street	1	1	0
Rowson, H., 18, Chichester St.	0	10	6
Sandford, G. W., 47, Piccadilly	1	1	0
Shirley, J. G., Bayswater	1	1	0
Snelling, Fras., 23, Farringdon St.	1	1	0
Starkie, R. S., 4, Strand	1	1	0
Strawson, G. F., High Holborn	0	5	0
Taylor, J. E., 10, Little Queen St.	1	1	0
Thompson, H. A., Chiswell St.	1	1	0

	£	s.	d.
Tippett, B. M., 3, Sloane Street	0	10	6
Urwick, W. W., Pimlico	1	1	0
Vizer, E. B., Lupus St., Pimlico	1	1	0
Warner, Chas. H., 55, Fore St.	1	1	0
Whitburn, A. R., 174, Regent St.	0	10	6
White and Son, 19, Park Terrace	1	1	0
Whysall, W., 177, Fleet Street	0	5	0
Willows, J. and J., High Holborn	2	2	0
Windle, Wm., 42, Portman Place	0	10	6
Wood, Edward	0	10	6
Wooldridge, J., 290, Euston Rd.	0	10	6
Wright and Co., 11, Old Fish St.	1	1	0
Wyman, Jno., 122, Fore Street	1	1	0
Young, Wm., Ball's Pond Road	0	10	6

Country.

	£	s.	d
Berwick, Davidson, John	0	10	6
„ Carr, Wm. Graham	0	10	6
Birkenhead, Dutton, John	1	1	0
Birmingham, Lucas, Joseph	0	10	6
Bridlington, Forth, Wm.	0	5	0
Brighton, Gwatkin, Jas. Thos.	0	10	6
„ Robson, Thos.	0	10	6
„ Noakes, Richard	0	10	6
Bristol, Butler, Samuel	0	10	6
Broadstairs, Doubell, James	0	5	0
Bromley, Baxter, Wm. W.	0	10	6
Chichester, Long, Wm. Elliot	0	10	6
„ Pratt, John	0	10	6
Cockermouth, Bowerbank, Jos.	1	1	0
Croydon, Crafton, Ralph C.	1	1	0
„ Lancaster, Henry	1	1	0
„ Barritt, George	0	10	6
Demerara, Knowles, Richd. J.	2	2	0
Denbigh, Edwards, Wm.	0	5	0
Dorchester, Davis, R. and J.	0	10	6
Dorking, Clift, Joseph	1	1	0
Florence, Groves, Henry	1	1	0
Gloucester, Hurst, Wm. F. H.	0	5	0
Gravesend, Beaumont, Wm. H.	1	1	0
Greenwich, Tugwell, W. H.	0	10	6
Harrogate, Coupland, J. (1865)	0	10	6
„ „ (1866)	0	10	6
Hendon, Goldfinch, George	0	10	6
Hirwain, Sims, Jos.	0	10	6
Horsham, Jull, Thomas	0	10	6
Howden, Saville, Jno.	0	10	6
Huddersfield, Fryer and King	1	1	0
„ Duffin, Thomas	0	5	0
„ Higgins, Thos. S.	0	10	6
Hull, Baynes, James	0	10	6
Ingatestone, Stuart, Henry J.	0	10	6
Leytonstone, Telfer, Fred.	0	5	0
Lincoln, Tomlinson, C. K.	0	10	6
Lincoln, Peppercorn, Benj.	0	10	6
Liverpool, Mercer, Nathan	0	10	6
Ludlow, Cocking, George	0	5	0
Manchester, Brown, Wm. Scott	2	2	0
„ Mitchell, John	0	10	6
Maryport, Cockton, John	0	5	0
Newton Abbott, Poulton, John	0	10	6
Northallerton, Warrior, Wm.	0	10	6
Northampton, Negus, Samuel	0	10	0
Oldham, Bagshaw, Wm.	1	1	0
Portsea, Tryon, Wm. G.	0	5	0
Portsmouth, Parsons, Wm.	0	10	6
Preston, Hogarth, Wm.	0	10	6
„ Armstrong, Henry	0	10	6
„ Houghton, Wm.	0	10	6
„ Oakey, James M.	0	10	6
„ Sharples, George	1	1	0
Ruthin, Bancroft, John James	0	5	0
Scarborough, Horton, Arthur T.	0	5	0
Shefford, Baigent, Wm. H.	0	10	6
Shepton Mallett, Ellis, Benj.	1	1	0
Southampton, Smith, John	0	10	6
„ Palk, Edward	1	1	0
„ Randall and Son	1	1	0
Stockport, Brooke, Fredk.	1	1	0
„ Shaw, Alex. H.	1	1	0
„ Yeoman, John	0	10	6
Stockton-on-Tees, Hodgson and Son	0	10	6
Sydenham, Pocklington, James	0	10	6
Teignmouth, Cornelius, R. B.	0	5	0
Torquay, Whiteway, Wm. H.	0	10	6
Tunbridge Wells, Sells, Robt. J.	0	5	0
Uttoxeter, Johnson, John B.	0	10	6
Wandsworth, Nind, George	0	10	6
Wellingborough, Thorne, John	0	5	6
Weymouth, Groves, T. B.	0	10	6
Winchester, Powell, Edward	0	10	6

DONATIONS.

	£	s.	d.
Baigent, William H. Shefford	10	10	0
Brown, William Scott, Manchester	2	2	0
Orridge, Mrs. Benjamin B., per Mr. Orridge	1	1	0
Twinberrow, William, 2, Edward Street	5	5	0

Field, John	1	1	0

PHARMACEUTICAL MEETING.

Wednesday, February 7th, 1866.

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 Medical Press.
The Technologist.
The Journal of the Society of Arts.
The Journal of the Chemical Society.
The Photographic Journal.
The Educational Times.
The Dental Review.
The British Journal of Dental Science. All presented by their respective Editors.
Pharmacopœia Helvetica. From the Swiss Apothecaries' Association.
Official Catalogue of the Italian Department of the Dublin International Exhibition. From the Royal Italian Commission.

Specimens of *Mannite*, from the leaves, flowers, and unripe fruit of the Olive-tree. From Professor De Luca, of the Royal University, Naples.

Specimens of Port-Royal Senna. From Dr. Tilbury Fox and Professor Bentley.

Dr. Attfield directed attention to some specimens of mannite, presented to the Society by Professor de Luca, of Naples. They were part of what the Professor had exhibited at the Dublin Exhibition, and he thought they possessed some physiological interest, as they had been extracted from different parts of the plant, and the relative quantities determined at different periods of the development of the parts from which they were obtained. In the 'Exhibition Catalogue' there was a note relating to these specimens, in which the Professor states:—"Mannite exists in different proportions in every part of the olive-tree: the leaves, flowers, and fruit containing the greatest quantity, the roots, wood, bark, and branches rather less. This saccharine principle is not always found in the same quantity at all stages of vegetation; at the period of blossoming it accumulates in the flowers and diminishes in the leaves: the fallen flowers, having once completed the phenomenon of fecundation, no longer contain any mannite; it has likewise been found impossible to obtain the slightest traces of it in the yellow fallen leaves: mannite exists in the fruit as long as it continues green, diminishing in proportion as it ripens, and disappearing entirely when it becomes perfectly ripe and contains the greatest quantity of oil."

A new form of *leech cage* was exhibited to the meeting by Mr. Shillcock. It consisted of a round glass jar, surmounted by a perforated zinc cap, and intersected by zinc or galvanized iron diaphragms, in which were round holes of different sizes, through which the leeches could pass, while the diaphragms formed stages on which they could rest.

PORT-ROYAL SENNA.

The President called attention to the specimens of Port-Royal Senna which had been presented to the Society, and were now upon the table. This senna, he understood, had been brought to this country from Jamaica, by Dr. Bowerbank, who thought very highly of its medicinal properties and mode of action; but as Dr. Tilbury Fox was present that evening, and had himself made experiments with it in this country, perhaps he would kindly narrate to the meeting the results he had obtained.

Dr. TILBURY FOX stated that he was glad to respond to the desire of the President, although his experience of the action and properties of this kind of senna was at present but on a very limited scale. His attention had been called to it, and Dr. Bowerbank had informed him that he had employed it extensively in Jamaica for nearly thirty years, and found it to be an efficient purgative, and one which was especially to be recommended over ordinary senna, from its more agreeable taste, and from its not producing griping. Dr. Fox said that he had himself prescribed it, and his experience of its action, etc., so far agreed with that of Dr. Bowerbank.

Professor BENTLEY said that he had obtained a very good specimen of Port-Royal senna some weeks since through a friend, who had received it from Dr. Bowerbank, who had, he understood, brought over a large supply with him from Jamaica, with the object of having it fully tried in this country. Upon a superficial examination, he (Professor Bentley) thought that it had been derived from *Cassia obovata*, Coll., from its marked resemblance to Italian senna, which was a cultivated variety derived from that plant; his time being then devoted to other matters of more pressing importance, he had put the senna on one side for further investigation, with a view, if he found it then of sufficient importance, to introduce the subject at one of the Evening Meetings of the Pharmaceutical Society. Upon the President informing him that morning of his intention to introduce the matter that evening to the meeting, he examined the specimen again in a more careful manner, and was then clearly convinced from the shape, etc., of the leaves and fruit, that this senna, which was labelled Port-Royal senna, and said to be derived from *Cassia Porturegalis* of Bancroft, was in reality obtained from *Cassia obovata* of Colladon, and that this plant must have been introduced into Jamaica from tropical Africa, and become naturalized. In order, however, to be quite convinced, he referred to various authorities, and found as he had expected, that he was correct in referring the botanical source of Port-Royal senna to the *Cassia obovata* of Colladon; the so-called *Cassia Porturegalis* of Bancroft being in reality nothing more than that species. The present senna therefore was derived from one of the species from which our officinal Alexandrian senna was obtained, as stated in the British Pharmacopœia. It had been probably introduced into Jamaica at an early date, as it was now found growing apparently wild, very freely, at Port-Royal, and medical writers on Jamaica for very many years past had spoken of its purgative properties, etc. There could be no doubt therefore of its being an efficient purgative, but further trials were necessary in this country before we could come to any positive conclusions as to its comparative value over the other kinds of senna now in use. From his own limited observations, and from what he had heard, he believed that Port-Royal senna would be found somewhat less active then either the Alexandrian or East Indian kinds. Under any circumstances, however, we were indebted to Dr. Bowerbank for bringing this senna prominently into notice in this country.

The following papers were then read:—

THE EMPLOYMENT OF GELATINE IN PLACE OF METAL FOR BOTTLE CAPSULES.

BY A. F. HASELDEN.

The readers of 'Temple Bar' will probably remember, in the December number of that periodical, an interesting and well-written article upon "Patents and Patentees." From the perusal of it, and some subsequent practical working, I came to the determination of bringing the subject before you, believing that there are points in it well worthy your attention.

Without asking you to travel with me through the contributor's entire article, I will, as briefly as I can, pick out a few of the more interesting parts, before I come to that portion which may be supposed to enter more especially into your and my domain,—in fact, that part concerning us as pharmaceutists and dealers generally.

"The Patent Office consists of a suite of rooms in Southampton Buildings, near Chancery Lane. Inventive genius," says the writer from whom I am borrowing, "deposits there annually considerably over £100,000; the surplus from successive years now amounts, at the end of 1865, to more than £200,000. The stamp duties on patents yield to the Exchequer £20,000 per annum; the office-fees paid by inventors amount to £91,000. After paying the very liberal expenses of the Patent Office out of this prodigious income, the sum of £44,000 remains; and this is the annual saving or profit which has accumulated to the above figures of £200,000. Large sums of money are positively thrown away by inventors: over 3000 petitions for letters-patent are sent in annually, but more than 800 of the petitioners fail to give notice of intention to proceed with their patents, and thereby lose collectively £4000, which they have paid in fees, and about 200 more fall off before the actual sealing of the patent; upon the average the 3000 fall away to 2000 patents actually sealed, and of these not more than 550 survive the first period of three years; that is, 1450 yearly decline to pay the additional sum each of £50, which is necessary for carrying on their patents beyond the third year. The result seems to be, that out of 3000 petitions for letters-patent there will only be 100 patents destined to survive more than seven years, although the law extends the privilege to double that period if the fees be paid.

"Now the payment of fees, or rather the inability or dislike to the payment, with the assistance of attendant circumstances, no doubt, contributes in some measure to this result. The course of patents, however, under the most favourable conditions, like true love, very rarely does run smooth: there are many shoals and quicksands upon which patentees may run foul and sink. A vast deal of useless trouble, worry, and expense might be spared in the matter of patents, if people would only bear in mind, first, what is entitled to a patent, and next, whether the invention has the requisite conditions. Inventions entitled to patents may be briefly enumerated as follows:—

1. "A new combination of mechanical parts, whereby a new machine is produced, though each of the parts separately be old and well-known.

2. "An improvement on any machine, whereby such machine is rendered capable of performing better or more beneficially.

3. "When the vendible substance is the thing produced, either by chemical or other processes, such as medicines or fabrics.

4. "Where an old substance is improved by some new working, the means of producing the improvement is in most cases patentable.

"It must be admitted, however, that in the case of certain lucrative patents no amount of accuracy will necessarily secure a patentee from trouble, if his patent be in opposition to an existing patent held by moneyed and determined parties. Instances are known in which every invention in the least interfering with an existing patent is at once legally attacked and crushed out of existence, either by forced compromise or the fear of law expenses. The fact is, that our patent laws need great amendment; and nothing could prove this more pointedly than the present case of 'Betts's Patent Metallic Capsule,' which promises an exuberant crop of ruinous lawsuits against a host of innocent tradesmen, and even the consumers of the article." To continue in the words of the contributor, and approaching my own share of the work—" In the meantime all must commiserate the luckless tradesmen who run the risk of getting entangled in the meshes of Mr. Betts's Chancery web. We do so heartily; and therefore beg to suggest to them a most efficient substitute for the patent metallic capsule, namely, *gelatine*, applied precisely in the same way as sealing-wax or resin—that is to say, in its melted condition, the top of the bottle being dipped into it. It is obvious that by repeated dippings, after cooling, any thickness of capsule may be effected.

" We must observe, however, that gelatine is too brittle when used alone, but fortunately science suggests a ready and effectual 'alloy.' This alloy is *glycerine*, that curious substance of which we may say that it is impossible to decide to what purpose it may *not* be applied. The proportion in which it may be added to the melted gelatine, to give it pliability and toughness, is about one ounce and a half to the pound of the latter, well stirred in. Of course any colour may be given to these capsules, either for ornament or to distinguish readily the various liquids or other preparations. In hot climates there are voracious insects that attack and eat everything, to wit, the white ant in China, and of course they are fond of all animal matter, so that the gelatine capsule will be endangered; but here again we are ready with the remedy. Bitter aloes and other repellents may be added to the melted mass, to secure this opportune rival from those tropical plagues, whilst it rescues its users from the worst of all plagues—the law, lawyers, and inexorable 'patent rights.' "

So far the writer in 'Temple Bar,' and very easy and feasible it appears; but there is in carrying out the gelatine scheme some practical difficulty to be overcome. To make the subject as clear as possible, let me ask, what are or were the disadvantages of the old sealing-wax and resin plan. In the first place, for home consumption, there was very little variety beyond the quality of the wax or resin, and the impression or seal stamped thereon,—in many cases no impression at all; in a general way, in removing the cork the resin flew about, and, being very adhesive when at all warm, was exceedingly disagreeable. When the cork was cut short off and flush with the neck of the bottle, it was almost next to impossible to extract the cork without some of the resin or wax falling in amongst the contents; and this may be especially noticed in all the one-ounce bottles of quinine. Again, in those articles sent to hot climates the resin or wax became partially melted, and the paper in which the commodity was wrapped adhered to the resin or wax; and so any distinguishing seal, stamp, or mark became obliterated, and thus for any purpose of protection was valueless. Again, if the cork, as is commonly the case, be left long, and simply tied over with paper, membrane, or leather, there can be no positive protection or guarantee that the contents have not been changed, mixed, or otherwise tampered with. Moreover, both the paper and leather, like labels, if exposed in the window or on the counter, become dirty, and as they cannot be cleaned must be renewed: thus the cost of capping is doubled and sometimes trebled; and in the case of proprietary articles sent abroad, if there was any peculiarity in the capping, as it could neither be cleaned nor exchanged, there must, I feel, have been frequent annoyances and sometimes loss.

Now the metallic capsule was calculated to remedy much of this, although not the whole of it. It made a neat and polished finish; fly-marks, dirt, or dust could at any time be washed off, and if the capsule was properly applied it became, to a great extent, a protection; so far, good and favourable to the employment of metallic capsules. On the other hand, if the capsule was carelessly put on, it was quite possible to remove it and replace it without injury, detriment, or discovery. Again, any writing or maker's name was not very distinct, and could only be made out after some study; moreover, there could be very little variety in appearance, which variety in some businesses is almost a necessity: variety lends a charm to most things, and assuredly to the appearance of the shop of a pharmaceutist, a perfumer, or an oil and Italian warehouseman, by whom a large amount of capsules have been used. These are some of the drawbacks to metallic capsules, to say nothing of any vexation on their account from other sources.

In gelatine we have a substance which, in the matter of capping, may be turned to account in more ways than one; still there are some obstacles in the way to perfection, but only such as may be overcome. There is room left by the writer of the 'Temple Bar' article for a considerable amount of practical working. It would seem, upon the first reading, that it is only requisite to melt the gelatine, colour it to taste, dip in the corks and necks of the bottles, and in a twinkling, like the tricks in a pantomime, the thing is done. Let us see what really occurs. Having melted the gelatine with as little water as necessary, and if any dirt be present having strained it, the requisite quantity of glycerine being added, and also some liquid cochineal to give a tint; the cork and neck of the bottle is dipped into it, taking care to have plenty of the material and sufficient room for the bottle; and the result is this, that, there being no slanting side-walls to the corks, the melted gelatine sticks about the cork, runs down the sides over the rim of the neck of the bottle, and gives, to say the least, a very unsightly appearance. If the cork is cut flush with the mouth of the bottle, a better thing is made; but the solution being transparent, although coloured, the top of the cork or bung shows through, and has by no means a neat look. It is obvious that this latter part is to be remedied by making the solution opaque, either with white-lead, gamboge, dragon's-blood, or vermilion, as may be seen by bottles on the table. If the cork is to be left long, as in most bottles containing liquids, then the side-walls, so as to form a perfect capsule, must be first made by tying over with membrane, leather, or paper, and then by dipping either into the transparent or opaque solution, and thus a very good substitute for a capsule can be made; but as yet there is nothing to indicate any particular article or maker; there is nothing to prove that the covering has not been taken off and afterwards re-tied and dipped. To meet this want,—and it is a want, because most capsuled articles are proprietary ones,—the transparent solution, either plain or coloured, must alone be used; any name, device, band, or trade-mark may be first affixed, and then the dipping should take place. Coloured leather can be employed, as in some of the samples. I may mention that generally two dippings will suffice for paper and skin, and three for leather, as that substance absorbs more; but it depends upon the strength of the solution, and a little practice will do more than a whole written volume in producing expertness. For the opaque capsule, where a name is not material, Russian glue will answer as well as gelatine, and at a considerably less cost. Amongst the various specimens which I have brought, there is one with aloes, for the especial patronage of the insects. I think I hear some one say, How about the cost? To this I am not quite prepared with an answer, but I do not think it could equal that of metal; something less than a shilling would pay for all the gelatine I have here used, say 60 to 70 bottles. I think another inquires, How long have they been done? Many in the early part of December, six or seven weeks, and these appear as perfect now as then. I must just say another word in favour of gelatine. When the bottle is to be opened, if the cork has been made short, it is only necessary to cut through the gelatine, which is easily done, and then remove the cork in the usual way: no pieces will fall amongst the contents. For bottles with long corks, and covered with any of the materials mentioned, cut the capsule round and remove it, but it cannot be used again for the same or any other bottle, and is thus, with a proper mark or label, a certain and perfect protection against the probability of the bottle being refilled with a substitute without detection; and when dirty, the gelatine capsule can be cleaned with a sponge and a little water, thus effecting a considerable saving.

I have thus endeavoured, with the assistance of 'Temple Bar,' to lay before you a subject which, I believe, may be advantageously made use of. I feel that I have not thoroughly exhausted it, and that some of you, more ingenious than myself, will be able to work it out more perfectly, and then, as I have done, bring your results to a future evening meeting.

"Into your scrip I pour my little store
And as I give I wish the little more."

5th February, 1866.

ON THE ADULTERATION OF SAFFRON WITH THE STAMENS OF CROCUS.

BY ROBERT BENTLEY, F.L.S., M.R.C.S. ENG.,

PROFESSOR OF MATERIA MEDICA AND BOTANY TO THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN, ETC.

Saffron must necessarily be dear, in consequence of so small a portion of the flower of the plant (*Crocus sativus*) from which it is derived, entering into its composition. It has been computed that upwards of 60,000 flowers are required to form a pound of saffron. For this cause, also, saffron has always been liable to frequent and great adulteration. The substances that have been most frequently employed for its adulteration are the florets of the safflower plant (*Carthamus tinctorius*), and those of the common garden marigold (*Calendula officinalis*). The former plant, indeed, has received the name of *bastard saffron;* and according to Pereira, and his observations have been recently been confirmed by myself, the so-called Cake Saffron of the shops, which was formerly obtained by submitting the ordinary hay or officinal saffron to pressure, is now commonly prepared from safflower florets, made with mucilage into a kind of paste, which is afterwards rolled out into cakes. Other adulterations of saffron that have been more especially noticed are, the petals of soapwort (*Saponaria officinalis*), the flowers of arnica (*Arnica montana*), and the flowers of a species of *Pulicaria*. Fibres of smoked beef, it is said, have also been employed for adulterating saffron, and other foreign substances have been likewise occasionally detected in different specimens of this drug. Saffron, again, from which the colour has been extracted has been used to adulterate genuine saffron. The intermixture with, or substitution of, the florets or petals of other plants with the genuine drug may be readily detected in many ways, but the plan commonly adopted is by examining the suspected portion, after maceration in boiling water, with a magnifying glass. A much simpler and better plan is to macerate some of the suspected saffron for a few minutes in boiling water, and then to take out a few separate pieces of the infused mass, and diffuse them by means of a stirring-rod in a glass of cold water; the vessel being then held up to the light, the short upper end of the style with its three attached linear stigmas, with their expanded somewhat wedge-shaped notched extremities (Fig. 4, p. 453), and the more or less separated loose stigmas, which together constitute true saffron, may be at once distinguished from the tubular or flattened florets or petals of other plants, if these latter have been used as adulterants of, or substitutions for, genuine saffron.

The subject of the adulterations of saffron has recently been brought especially under my notice, in consequence of a specimen of saffron supposed to be adulterated having been forwarded to this Society for examination from a wholesale house in the City. From inquiries made afterwards, I found that a sample of this saffron was offered for sale by two Spaniards, who came furnished with a recommendation from a gentleman well known to the members of the

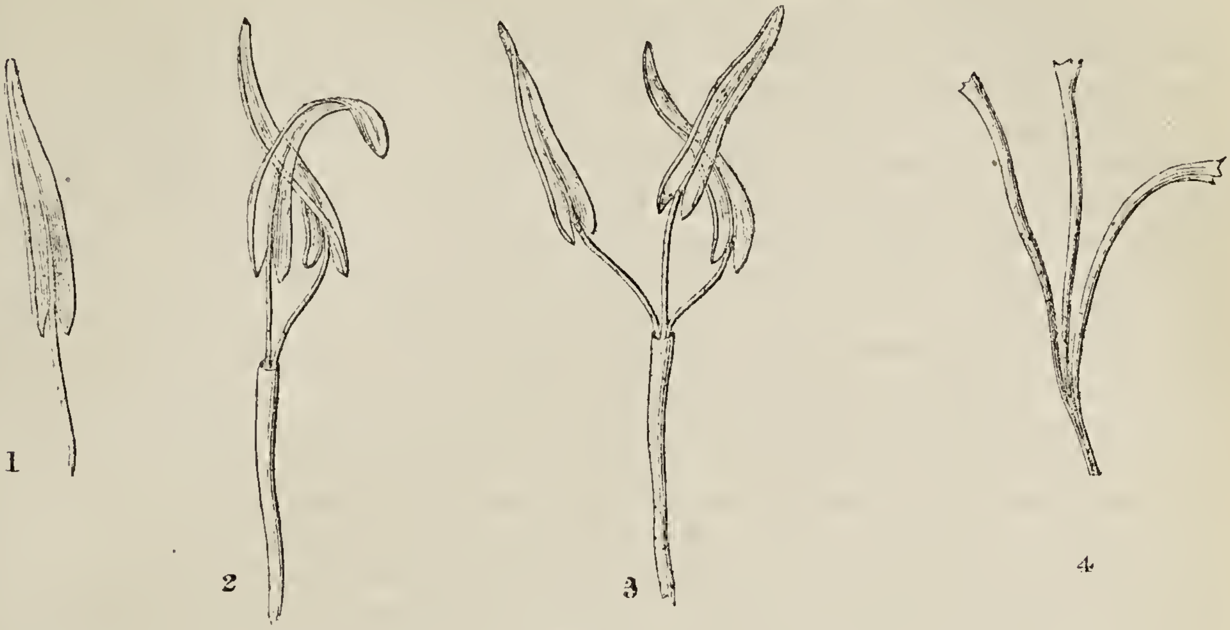

Fig. 1. Stamen of Crocus, somewhat enlarged in order to exhibit more distinctly its characteristics.

Fig. 2. A part of the tubular portion of the perianth of Crocus, bearing two stamens.

Fig. 3. The same as Fig. 2, except that three stamens are inserted on the inside of the tubular portion.

Fig. 4. The upper end of the style, with the three stigmas, of *Crocus sativus,* which together form genuine saffron.

firm; and it was stated that a quantity of it could be furnished if required. Upon examination, the saffron was refused by the firm, as it did not answer to their tests of true saffron, and a sample was afterwards forwarded to this Society for further investigation.*

Upon a superficial examination this specimen of saffron presented a considerable resemblance to genuine saffron in general appearance, colour, and odour. Upon a closer inspection, the odour was found to be much less penetrating and aromatic than that of true saffron, and to have added to it something of a different and peculiar nature; and the mass was seen to be principally composed of somewhat cylindrical twisted compressible bodies, with a few firmer thread-like ones intermixed, instead of being wholly composed of firm thread-like bodies, as would have been the case with a specimen of genuine saffron. In other words, the present specimen of saffron was found to be less fibrous or filamentous in appearance than that of genuine saffron.

Upon infusing a portion of the specimen in warm water, and comparing the appearances which it then presented with some true saffron exposed to similar conditions, the difference between the two was most striking, and could not but have been evident to any ordinary observer. Thus, in the case of the genuine saffron, the colour was seen to be but slowly communicated to the water, which gradually assumed a deep orange-yellow colour, and remained perfectly clear and transparent; and when the infused mass was stirred up and diffused through the liquid, the peculiar appearance and structure of the styles and stigmas constituting genuine saffron as already noticed (Fig. 4), was clearly exhibited. With the other specimen, however, the colour was almost imme-

* I shall be greatly obliged to any chemist, who, when he has reason to suspect the adulteration of any drug, but cannot satisfy himself upon the adulterant, if he will forward a specimen to me for further examination. In this way, old adulterations may be again exposed, and new ones detected and brought before the public.

diately taken up by the water, which almost immediately assumed a deep orange-yellow colour, and also presented a turbid appearance from the diffusion through it of small granules. These granules were also seen on the side of the glass vessel in which the infusion had been made; and although many of them ultimately subsided to the bottom of the vessel, many remained in suspension, so that the infusion, however long kept, never became clear. Upon examining the infused substance it was seen to be principally composed of a closely-adhering mass of very pale-yellow flabby more or less flattened, and somewhat cylindrical twisted bodies, with a few thread-like deep orange-yellow ones intermixed. The appearance of this mass was most striking, and would in itself have led to the detection of the adulteration. It was seen at once from the shape and colour of the filamentous portions that they were genuine saffron, but the question now arose as to the nature of the other and greater portion of the mass. To determine this, I at first examined some of the separated pieces of the mass with a magnifying glass, and satisfied myself directly that they were not the florets or petals of any of the plants which had been hitherto alluded to as having been employed to adulterate saffron; neither were they the similar parts of any other plants, nor any substances hitherto described as adulterants of saffron; but, instead of any of these, I found bodies of a pale yellow colour, half an inch or more in length, attached below to a firmer and nearly cylindrical stalk (Fig. 1, p. 453), which latter was also in some cases adherent to a flattened portion of a petal or a tubular body. I also found a few larger pieces of the coloured divisions of the perianth intermixed with the above. I concluded that the bodies under examination must be stamens, but in order to satisfy myself more completely on this point, I took a few of them on the end of a glass rod, and diffused them in a glass of cold water; that they were then the stamens of a Crocus there could be no doubt, for I had before me open cellular bodies half an inch or more in length, with a somewhat pointed apex and an arrow-shaped base (Fig. 1, p. 453). Each of these was also seen to be attached below to a solid nearly cylindrical thread-like shorter stalk; and this latter was, in some instances, also adherent to a portion of a petal. Upon more complete examination in the same way, I found that some of the separated pieces were two or more inches in length, and consisted of a tubular portion below, from the inside of which there arose above three filaments bearing at their extremities arrow-shaped (sagittate) anthers (Fig. 3, p. 453); in fact, here was the tubular portion of the flower of a Crocus, with the three stamens found in it as in all the other plants of the Natural Order to which it belonged, attached. I could also readily make out by the unassisted eye, although still better by the aid of a small magnifier, the mode of attachment of the anthers to the filaments, and the manner in which they had dehisced. As the number of stamens and the attachment and dehiscence of the anthers is very marked in the order *Iridaceæ*, to which the genus *Crocus* belongs, I had thus a further confirmation, if any were needed, of the adulterant being the stamens of a Crocus, which had been previously twisted so as to alter their natural form and characters, and thus render them more difficult of detection. In some cases I found similar tubular portions bearing two stamens (Fig. 2, p. 453), the third stamen having become detached.

A very ready way of detecting this adulteration of saffron with stamens is to take a small portion of the suspected specimen and diffuse it in a glass of cold water by means of a stirring-rod for about a minute, the water will become immediately coloured, and if the stirring be now discontinued the whole mass will rise to the surface of the fluid, and the genuine orange-yellow-coloured saffron will be readily distinguished from the pale-yellow-coloured twisted stamens. The proportion of adulteration may in this manner be readily estimated. If instead of using cold water, boiling water be employed in the above experiment, I find a somewhat different result; thus, if the proportion of stamens in the specimen be large, as in the one now being described, the whole infused mass will rise towards the surface of the water in the manner just mentioned; but if there be only a small admixture of stamens, the genuine saffron will sink towards the bottom of the fluid, and the stamens alone rise and float on its surface. In the former case, the true saffron, being in small quantity, appears to be so entangled with the stamens, that it is carried upwards with them.

Having ascertained that the specimen of saffron was adulterated extensively with the stamens of a Crocus, I had an explanation of the cause of the turbid appearance of the solution formed by infusing some of it in water, as already noticed, and of the nature of the suspended granules. These granules must be those of the pollen which had been washed out of the anthers by the water in which the stamens had been infused; and, upon examining them by the microscope, I was able to prove that my opinions were correct. The best way to see these granules is to dip a glass rod into the turbid solution formed by macerating the adulterated saffron in water, and then drop the adherent fluid on a piece of glass. This is to be covered with another piece of thin glass in the ordinary way, and placed on the stage of the microscope; the pollen granules will then be observed to be perfect globes, of a yellow colour and glistening character. Mixed with the pollen a small portion of some angular earthy fragments will be also noticed. The proportion of this earthy matter, however, is not great, and hence its presence is doubtless accidental, and not an intentional admixture with the saffron, as is sometimes the case with sand, etc.

That the stamens thus used for adulterating saffron were those of the Saffron Crocus (*Crocus sativus*) I have every reason to believe, from minute examination of their form and appearance, and from comparison with those of other species of crocus; indeed, there would be no inducement to those by whom such an adulteration had been performed to throw the stamens of the saffron crocus away, and collect the corresponding parts of other species; it would be far easier to pluck the stamens and the parts constituting genuine saffron from the same flower at the same time, and mix them together. Moreover, the common species of crocus flower in spring, while the saffron crocus flowers in the autumn months; and hence, it would be still less probable that the stamens would be gathered from one species at one season and the stigmas from another species at a different period, and the two be then mixed together. It is possible certainly, that the collector of the saffron might have had nothing to do with the adulteration, but that the purchaser of the genuine drug had afterwards mixed with it the stamens of another species of crocus, but having carefully examined the stamens in the present specimen, and compared them at the British Museum and Kew with those of the saffron and spring crocus, etc., I think there can be no doubt but that both the stigmas and stamens had been gathered at the same time and from the same plant, namely, from the *Crocus sativus*, and then mixed by the collector.

Having now proved that the specimen of saffron under examination was extensively adulterated, being composed, as nearly as I could ascertain, of about one-third genuine saffron, and the remaining two-thirds principally of twisted stamens, and to a slight extent of parts of the adherent or separated coloured divisions of the perianth, and of the tubular portions of the flower, another question now arose. The tubular portion of the flower of the saffron crocus, in its natural condition, is nearly white, while the anthers are pale yellow; but here the whole of the specimen had a nearly uniform orange-yellow colour. This is, I think, readily to be explained. The stamens, etc., had been dyed with some orange-yellow-coloured solution—probably the whole specimen together—by which a nearly uniform deep orange-yellow colour had been given to it. That such was the case seems clear from a comparison of the different appearances produced on a mass of this saffron directly after its infusion in warm or cold water with that of genuine saffron under the same conditions; thus, in the former case, as already noticed, the orange-yellow colour of the greater portion is immediately communicated to the water, and the anthers left of their natural pale yellow colour, while the genuine saffron mixed with it retains the principal portion of its orange-yellow colour for some time afterwards; while in the latter, or true saffron, the whole retains its orange-yellow colour for a long period. The nature of the colouring matter thus used for dyeing the saffron is more difficult to determine, and I am as yet by no means satisfied upon this point. It may have been a very strong solution of genuine saffron, and the similarity of the colour produced by infusing in water this spurious saffron and that of genuine saffron would appear strongly to confirm this view; but when we remember how little genuine saffron is contained in it, yet the depth of colour as shown by infusion and by its dilution with water, is scarcely in any degree less than that of genuine saffron, this becomes more doubtful. This, however, is a matter of comparatively trifling importance, and may be left for future investigation.

This adulteration of saffron with the stamens of crocus has never been noticed previously in this country; no allusion having been made to it in the works of Pereira, Royle, Christison, or other of our authorities on materia medica; neither had it, so far as I knew when the above was written, been noticed by foreign writers on pharmacology, but I have since had my attention directed to a note on a similar kind of adulteration by Professor Guibourt, which had occurred in France. I do not, of course, mean to say that the stamens of Crocus have not been before noticed in specimens of saffron, for occasionally a few anthers may be detected in them; but as these are found of their natural pale-yellow colour, and untwisted, no attempt having been made to dye and otherwise alter their appearance, their presence is evidently accidental, and due to carelessness in collecting saffron.

Since the above was written, I have examined various specimens of saffron obtained from different quarters, in two of which I have detected the same fraudulent admixture of stamens with the genuine drug. In both these instances, however, the admixture of stamens with the genuine saffron occurred to a far less extent than in the specimen I have particularly described in this paper. One of these specimens was certainly twenty years old, and was marked "adulterated saffron"; and the other was a specimen of saffron exhibited as genuine at the Great International Exhibition held in London in 1862. Such being the result of my examinations in so short a period, I think it will soon be found that the adulteration of saffron with the stamens, etc., of Crocus is by no means rare in this country and elsewhere.

Mr. DEANE could not forbear remarking, after the interesting paper they had just heard read, upon the importance of chemists at the present day possessing some knowledge of practical botany, as without such knowledge the admixture of stamens, etc., in the present instance could not have been discovered; but thus armed, the fact was made out and everything relating to the admixture rendered satisfactory. Mr. Deane said that he was not familiar with the botanical characters of the Saffron and other species of Crocus; hence, he should like to ask Professor Bentley whether he had any reason to believe that the admixture of stamens, etc., in the specimen of saffron, now described, had been derived from the flowers of the common spring crocus, and afterwards fraudulently mixed with genuine saffron, or whether they had been obtained together with the true saffron from the flowers of the saffron crocus, and their presence consequently the result of very great carelessness in collecting the true saffron.

Professor BENTLEY, in reply to Mr. Deane, said that there could be no doubt but that in the present specimen of saffron a great and systematic adulteration had taken place. It was quite true that we might occasionally find a few stamens, as he had noticed in his paper, in ordinary specimens of saffron, which were clearly traceable to want of sufficient care in collecting, but in such cases the stamens were readily distinguishable by their pale yellow colour, no attempt having been made to give them the appearance of true saffron ; but here the stamens, etc., constituted about three-fourths of the whole bulk of the specimen, and had been twisted and dyed so as to give them the appearance of the genuine saffron with which they were mixed. So far as his observations extended, and he had very carefully examined the stamens in the present specimen, he had no doubt but that they had been derived from the flowers of the saffron crocus.

A MEMBER observed that he had been recently supplied with a specimen of saffron, which, from the description now given by Professor Bentley of its adulteration by the stamens, etc., of the crocus, he believed had been adulterated in the same way.

Professor BENTLEY said it was very probable, as he had been informed, on good authority, that a quantity of the adulterated saffron now described by him had been lately disposed of. He had been likewise told that a similar kind of saffron had been in the market about two years since, and had been disposed of at Liverpool.

The PRESIDENT observed that although saffron had not much value in a medicinal point of view, still it was a substance in extensive use, and one which, from its high price, was very liable to adulteration ; hence, he was sure the meeting would be greatly obliged to Professor Bentley for his valuable paper, and also for offering to examine any specimens forwarded to him which were suspected to be adulterated.

PHARMACEUTICAL SOCIETY, EDINBURGH.

There was a meeting held in St. George's Hall, on Tuesday evening, 20th current, at nine o'clock. Mr. Kemp, President, in the chair. There was a good attendance. Mr. Mackay read a communication in reference to the detection of explosive gases in mines, and noticed some of the forms of apparatus proposed for this purpose by Mr. G. F. Ansell, of the Royal Mint. After glancing at the danger which at present attends the discovery of the presence of fire-damp, by the old method of employing a lighted candle, or even by the use of the Davy lamp, he proceeded to describe the principle on which Mr. Ansell's proposed instruments for the detection of the presence of deleterious atmosphere were constructed, viz. the well-known law of the diffusion of gases. He then showed to the meeting one of the simplest forms of such an apparatus, connection with a galvanic apparatus and alarm bell, and where, by the introduction of coal gas, the pressure on a column of mercury, placed in a tube of the U form, was so increased that it rose in one of the limbs, and thus bringing the two wires of the galvanic arrangement into contact, completed the circle and caused the note of alarm to sound loud and clear. After some discussion on the form and uses of the apparatus, thanks were voted to Mr. Mackay by Dr. Smith.

Dr. Argyll Robertson then exhibited and described a new mechanical leech. This was an instrument intended (as its name implied) for the local removal of blood in circumstances similar to those in which leeches were usually employed. It was in reality a modification of the cupping apparatus generally employed. It consisted of two parts—a scarificator or cutting instrument, and a cylinder for the reception of the blood to be abstracted. The cutting-apparatus consisted of a small steel cylinder (about $\frac{1}{5}$ inch in diameter) carefully sharpened at one extremity, very much resembling, on a small scale, a punch employed for cutting out gun-wads. This *punch* fits into a brass case, the central portion of which can be revolved with great rapidity when traction is made upon a cord wound round a central stem (to which part the punch is fixed by means of a screw). The cutting part of the punch can be made to project beyond the brass case to a variable extent. By applying the sharp extremity of the punch to the skin, and drawing the cord, a circular incision is made corresponding in depth to the extent to which the punch projected beyond the brass case.

The cylinders for receiving the blood are of glass, about an inch in diameter, and capable of holding two ounces of blood. They are fitted with a cork piston with a steel rod, which can be elevated by means of a screw. As soon as the incision has been made, one of the glass cylinders is to be applied, and the air exhausted by elevating the piston, when the vacuum is supplied by blood drawn from the wound. From a single incision as much as four ounces of blood may be removed.

This instrument possessed advantages over the ordinary cupping-instrument, inasmuch as it may be applied to many situations where the other cannot, as the amount of flat or plane surface required is much less. It is not so painful an application, and the resulting cicatrix is less. Over leeches it possesses the advantage of abstracting blood much more rapidly and also more certainly. It is well known that the effects produced by the abstraction of blood are most readily obtained (and at least sacrifice of blood) when it is *rapidly* removed. The only disadvantage this and all other instruments labour under, when compared with leeches, is that an experienced operator is required; whereas if the patient cannot apply the leeches himself, there is seldom much difficulty in getting some old wife to do so.

Dr. Robertson's attention had been directed to this instrument while on the Continent, where he had seen it much employed by oculists and surgeons in general. He had often seen great benefit result from its use in deep inflammatory affections of the eye.

In this country public and professional opinion was so much opposed to depletion in any form, that an instrument to effect even the local abstraction of blood might be looked upon as devoid of interest; but in the event of blood-letting becoming as common here as it once was, this instrument might be of great service.

The name of the instrument in Berlin, where it is made, is the *Herteloupe*, so called from the inventor and first maker of the apparatus.

The instrument was very much admired, and as Dr. R. had an opportunity of contrasting the old French mechanical leech, the superiority of the one Dr. R. exhibited was made very apparent. Thanks proposed by the President were very cordially awarded to Dr. Robertson.

Edinburgh, Feb. 23, 1866.

PROVINCIAL TRANSACTIONS.

LEEDS CHEMISTS' ASSOCIATION.

The fifth meeting of the Session was held at the Philosophical Hall, on the evening of Wednesday, February 14, 1866; Mr. Edward Thompson in the chair.

Messrs. Kingerlee and Theobald were elected associates.

James Holroyd, Esq., exhibited by the oxyhydrogen light projected images of the beautiful photo-micrographs taken by Dr. Maddox; also Mr. Haes's photographs of animals in the Zoological Gardens, Regent's Park. Mr. Holroyd added to the interest of the exhibition by introducing and explaining the construction of the lantern used for exhibiting opaque objects, instead of the prepared transparent slides.

Mr. R. H. Davis, of Harrogate, a Corresponding Member, read a paper entitled, "The Imperial Saline Ferruginous Well at Harrogate (formerly called the Cheltenham Saline Chalybeate Well), its History and Analyses."*

The following is an abstract of the paper:—This saline chalybeate water, and also the pure chalybeate, were discovered in November, 1818. Dr. Hunter gives the following interesting account of their discovery†:—"The two springs were discovered by boring in search of sulphur water to supply the increased demand for the baths. The alluvial earth having been removed, a stratum of clay presented itself, beneath which lay a bed of sand, and this was found to cover a dark bluish aluminous earth, from under which the water issued. Three borings were made, each to the depth of eight yards, the first and third in the lowest part of the valley, and a few yards distant from the fence adjoining the road.

* It is in this water protochloride of iron and chloride of barium have been recently discovered.

† 'An Essay on Two Mineral Springs recently discovered at Harrogate,' by Adam Hunter, M.D., F.R.M.S.E. 1819.

"In the first the water was found impregnated with salt; this was subsequently abandoned upon the discovery of the third, or saline chalybeate water, which supplies the well now in use. The second boring, on the rising ground in a line at right angles with the first and third, and at a distance of sixteen yards from the latter, is the chalybeate spring.

"The wells are sunk deep enough to allow of cisterns; these were covered with strong flags accurately cemented, layers of baked clay and earth being added to exclude the air and extraneous matter."

ANALYSES OF THE IMPERIAL SALINE FERRUGINOUS WATER.

Saline Constituents in an Imperial Gallon (in grains).

	Hunter, 1819.*	Scudamore, 1820.†	Murray, *circa* 1821.‡	Garner, *circa* 1821.§	Hunter, 1829.‖	Hofmann, 1854.¶	Muspratt, July, 1865.**	W. A. Miller, Nov. 1865.††	Muspratt, Jan. 1866.‡‡
Sulphate of Lime	11·25	2·23		2·325					
Sulphate of Soda			2·425						
Carbonate of Lime	3·75	8·04		8·375		7·604			
Carbonate of Soda			10·0875						
Carbonate of Magnesia		·96		1·00					
Carbonate of Manganese						trace.			
Oxide of Manganese								trace.	trace.
Fluoride of Calcium						trace.			
Chloride of Calcium	37·50	26·40	36·6875	27·5	43·50	51·629	125·587	138·43	133·642
Chloride of Magnesium	16·25	11·88	13·5	12·375	9·65	34·027	84·716	84·39	84·716
Chloride of Sodium	542·50	360·48	364·375	375·5	576·50	158·840	208·468	205·92	208·468
Chloride of Potassium						27·410	1·842	3·84	4·013
Chloride of Barium								6·78	7·717
§§Chloride of Lithium							trace.	bare trace	trace.
Protochloride of Iron							22·014	14·49	16·011
Protocarbonate of Iron	9·062	4·176	·4·35	4·35	7·685	4·627	10·482	11·62	10·842
Bromide of Sodium						trace.	tracc.		
Iodide of Sodium						trace.	trace.		
Ammonia						trace.			
Silica	Loss	·48	·5	·5		1·450	·416	trace.	trace.
Organic Matter	3·125					·282			
Total	623·437	413·35	431·925	431·925	637·335	285·869	453·525	465·47	465·049
Total residue by experiment					636·				

Cubic Inches of Gases in the Gallon.

	Hunter, 1819.*	Scudamore, 1820.†	Murray, *circa* 1821.‡	Garner, *circa* 1821.§	Hunter, 1829.‖	Hofmann, 1854.¶	Muspratt, July, 1865.**	W. A. Miller, Nov. 1865.††	Muspratt, Jan. 1866.‡‡
Carbonic Acid	7·9				5·75	19·50	25·	26·28	25·40
Carburetted Hydrogen						5·00			
Oxygen	1·0875					1·02	tracc.		
Nitrogen	4·9625				7·75		tracc.	8·08	7·55
Total	13·95				13·50	25·52	25·	34·36	32·95

The saline chalybeate water at once attained a celebrity which bade fair to rival the old sulphur well; it was first called the new saline chalybeate or Caledonian spring, while the pure chalybeate was called the Hibernian spring. They did not enjoy these

* 'An Essay on Two Mineral Springs recently discovered at Harrogate,' by Adam Hunter, M.D., F.R.M.S.E. 1819.

† 'The Mineral Waters of Harrogate,' by Adam Hunter, M.D. 1830.

‡ 'A Treatise on the Mineral Waters of Harrogate,' by J. Garnett, M.D. 1822. § *Ibid.*

‖ 'The Mineral Waters of Harrogate,' by Adam Hunter, M.D. 1830.

¶ 'Chemical Analysis of the Mineral Waters at Harrogate,' by A. W. Hofmann, F.R.S. 1854. *Vide* 'Pharmaceutical Journal,' vol. xiv. p. 125.

** Original manuscript.

†† Original manuscript.

‡‡ 'Chemical News,' January 19th, 1866.

§§ By spectroscope.

titles long, however, and soon degenerated from national to personal names, viz. Oddy's saline chalybeate, and Oddy's pure chalybeate springs, which were afterwards changed to Williams's, when the property changed hands. During the time these wells were the property of the above owners, they appear to have gradually acquired the names which they have retained up to the present time, of Cheltenham saline chalybeate and pure chalybeate springs, from the then supposed resemblance of the saline chalybeate to the waters at Cheltenham.

As some of the older analyses are given by their authors in the wine gallon, and the iron as oxide, they have been calculated to correspond with the more recent analyses.

Dr. Hunter was the first to analyse this water in 1819, and deemed it of so much importance as to publish an essay upon it and the pure chalybeate water. Quoting his own words,—"The analysis of these two springs was conducted with as much care as possible. The experiments, which could be finished in a few hours, were undertaken upon the spot, but evaporation and other tedious processes were performed at Leeds, on the water carefully bottled and brought over for the purpose."

In early life Dr. Hunter settled in Leeds, and for many years held the office of physician to the Leeds General Infirmary and Public Dispensary, and also that of lecturer on the practice of physic in the Leeds School of Medicine. He took an active part in the original formation and support of the Leeds Philosophical Society and the Leeds Mechanics' Institute. He died June 22nd, 1843.

The following year Sir Charles Scudamore published an analysis, which, it will be observed, differs widely from Dr. Hunter's, the quantity of saline residue being only two-thirds, the iron less than half. Sir Charles Scudamore was assisted in his analysis by Mr. Garden, operative chemist, London. Dr. S. says:—"This water is unquestionably the second in importance among the various springs of which Harrogate has to boast. It appears to me to be a water possessing an excellent combination of saline ingredients, and of oxide of iron, held in solution by *carbonic acid.*"

About the following year Dr. Murray furnishes an analysis, which shows in the total a little increase in the contents; yet there is a correspondence in the various constituents to the analysis as published by Sir Charles Scudamore, the introduction of the two new salts of soda and the absence of two salts of lime is evidently caused by a difference in the mode of constructing the table of analysis.

Dr. Murray took the degree of doctor of medicine when only nineteen, and must have been possessed of considerable skill and experience in chemistry, through having had the advantage of being some time in the laboratory of the Royal Institution; he appears to have been on intimate terms with Sir Humphry Davy, Sir Joseph Banks, etc.

Dr. Garner made an analysis about the same time, which corresponds in an extraordinary degree with Dr. Murray's, especially in the quantity of iron and total amount.

In 1829 Dr. Hunter was engaged in writing a treatise upon the whole of the Harrogate waters, and at this time he re-analysed the saline chalybeate water, with the co-operation of Mr. W. West, of Leeds, and found an increase of 50 per cent. of saline matter upon the quantity given by Scudamore, Murray, and Garner; his results also did not correspond with his previous analysis in 1819. It will be observed that the discrepancy is not only in the total of contents, but that in this second analysis he found no trace of a sulphate.

We now come to the analysis of the most illustrious chemist who has been engaged with the investigation of this water, viz. Professor Hofmann. He found not half the quantity of saline residue given by Dr. Hunter, and about 30 per cent. less than the amount stated by Scudamore, Murray, and Garner; there is, however, a correspondence in the amount of iron given, compared with that found by the three last-named analysts.

In Dr. Hofmann's report on the Harrogate waters,* he enters into details respecting the method by which he made the analysis. He says, speaking of the chalybeate waters: "The iron had been partly deposited from some of the waters by the time they arrived in London; it was therefore precipitated, in a special experiment at the well, by means of sulphide of ammonium from pretty large quantities of the water, and ultimately weighed as sesquioxide. Lastly, the total amount of solid residue was obtained

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* *Vide* 'Pharmaceutical Journal,' vol. xiv. p. 75.

by evaporating the water to which a weighed quantity of carbonate of soda had been added, and carefully drying at a temperature from 248° to 266° F."

In addition to the table of analyses,* Dr. Hofmann gives the direct results of two analyses of this water, so that taking just what is mentioned in his report, and ignoring all the experiments which he does not mention, his analysis as published is not the result of *one*, but *several* investigations.

In 1841–42, Dr. Bennett, a physician resident in Harrogate, experimented with this water; he evaporated down portions every month, and his experiments extended over a whole year. The quantity of water operated upon was eight ounces, and the temperature employed in evaporating was 140° F.

The variations in quantity of residue were very considerable, in some instances as much as 25 per cent.; taking the lowest amounts obtained in July and August, 1841, and calculating them as per gallon, gives 318 and 316 grains respectively. The residue of this water is found to lose 9½ per cent. when exposed to 240° to 250° after being dried in a water-bath at a temperature of about 180°; deducting therefore this percentage from the amounts obtained by Dr. Bennett, leaves 287·9 and 285·9 grains per gallon, the quantity almost identical with that found by Dr. Hofmann.

The next analyser who investigated this water is Dr. Muspratt, who discovered one of the new constituents, viz. protochloride of iron. The rarity of this salt of iron in mineral waters, makes its discovery in a water at Harrogate very interesting. Dr. Pereira† mentions only two springs in Europe as containing it, the Selken-brunnen at Alexisbad, in Germany, and Bukowina, in Silesia; these two springs also contain protosulphate of iron, they are about the same strength, as regards iron, as this Harrogate saline ferruginous water.

Dr. W. A. Miller's analysis, which was made last November, revealed another new constituent, chloride of barium; this is an equally rare constituent in mineral waters. A mineral spring in Germany, Kreuznach Elisen-brunnen,‡ is stated by Struve to contain it in the proportion of 2·875 grains in the gallon.§ Three brine springs at Tarentum, on the Alleghany river, and a mineral spring at St. Leon, in Canada, complete the list.

Although the soluble salts of baryta are classed among poisons, yet the small quantity taken in imbibing the usual dose of the water (4 oz.) is not such as to occasion any alarm, especially, as with a revived and increasing reputation, this water has been extensively used and prescribed for several seasons, with the best effects, in very numerous cases.

In looking over these various analyses, we are struck by their remarkable discrepancies, and, unless reasonable grounds can be urged to show that the character of this water has *radically changed*, it will be in vain to attempt to reconcile them.

Mr. Davis gave the opinions, bearing on this point, of some of these analysers.

Dr. Hunter says ‖ :—"From the experience of others, as well as my own, I cannot doubt that some of these springs occasionally vary in strength, and it is probable also, in the variety of their ingredients." It is satisfactory, however, to know that the most important of them have been found the least liable to these changes."

Dr. Hofmann states,** "that *equal amounts* of water of most of the springs left on evaporation *different quantities* of saline residue."

Dr. Hunter mentions the following experiments he made with the water in 1819††:—

"Expt. *l*. A few drops of the tincture of galls being added to a glass of the water, it immediately assumed a purple colour, and, on standing ten minutes, it gradually deepened in appearance."

"Expt. *m*. The triple prussiate of potash produced no sensible change; but a few drops of muriatic acid, being first dropped into another glass of the water, the triple prus-

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* 'Chemical Analysis of the Harrogate Medicinal Waters,' by A. W. Hofmann, F.R.S., p. 34.

† Pereira's 'Materia Medica,' vol. i., pp. 306, 307, 835, 840.

‡ Fownes's 'Manual of Chemistry,' Appendix,' p. 797.

§ 'Chemical and Physical Geology,' by Gustav Bischof, vol. i., pp. 337, 448, 449.

‖ 'The Waters of Harrogate,' by Adam Hunter, M.D., Preface 1st edit., p. 5.

** 'Pharmaceutical Journal,' vol. xiv., p. 76.

†† 'An Essay on Two Mineral Springs recently discovered at Harrogate,' by Adam Hunter M.D. 1819.

siate was added as before, when a beautiful light green colour was produced, which increased in intensity by remaining exposed to the air."

"Expt. *n*. The same experiment being repeated on water that had been *boiled* and filtered, *neither the purple nor blue tinge* was produced by the gallic or prussic tests."

"From the first of these experiments, it appears that a small quantity of iron is present, in a low state of oxidation, and as no traces of it were found after boiling, it necessarily follows that its solvent must be the carbonic acid."

Repeating these experiments now with this saline ferruginous water, the tests at once show the presence of an abundance of iron after it has been boiled and filtered. There is, therefore, no doubt that the water, in 1819, did not contain even a trace of protochloride of iron.

"Expt. *c*. A few drops of muriate of barytes added to a wineglass of the water, after standing half an hour, exhibited a very slight cloud; from this I infer the presence of sulphuric acid, in combination with some of the earths or metals, though in a very minute quantity."

As sulphates are incompatible with salts of baryta, it is evident no chloride of barium was present in the water then.

When Dr. Hunter repeated his analysis of this water in 1829, and failed to detect constituents which he had found in 1819, he would be the more led to search whether or no the water had gained any, and we may reasonably assume that he would, at this time, make a similar series of experiments, as when he examined the water in 1819, and would in like manner note the absence of iron after the water was boiled. If this is admitted, then the intervening analyses by Scudamore, Murray, and Garner, are freed from the imputation of failure.

The remaining exception is Dr. Hofmann. On referring to his analysis, it will be observed that the quantity of protocarbonate of iron he obtains, corresponds very nearly with that found by Scudamore, Murray, and Garner. To assume that the water in 1854 contained protochloride of iron, it necessarily follows that the water had lost some portion of protocarbonate, which had been replaced by a corresponding portion of protocarbonate, which had been replaced by a corresponding portion of protochloride; now, if the quantity of iron obtained had been an *increase* upon former analysers, then there would have been some ground for suspicion; but of the two assumptions, "that a portion of the protocarbonate had been replaced by a portion of protochloride," or "that the iron then existed, in the same state as proved by Dr. Hunter," this latter is certainly the most reasonable; and further, to suppose that by some negligence, Dr. Hofmann had been supplied with water from the wrong pump, places us at once in the following dilemma:—The quantity of iron contained in the pure chalybeate water, as shown in Dr. Muspratt's analysis,* is more than what Dr. Hofmann found in the saline ferruginous water in 1854, therefore, however much the saline ferruginous water, as it is *now*, may be diluted with the pure chalybeate water, it is impossible to reduce it so as to correspond with Dr. Hofmann's results; and as the bottling of the samples of the water for analysis was superintended by a resident physician, the theory of substitution is not tenable.

The change in the saline ferruginous water may be due to the following causes:—

By percolations into the well, or into the spring, as it approaches the surface.

The kind of strata passed through in boring admits of this theory:—There is a statement, by a Dr. Garnett, in 1794, which may have some weight with regard to this; he says,† "In a chalybeate water, near the road, and not far from the crescent garden, the

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* Pure chalybeate water (July, 1865):—

Protocarbonate of Iron . . .	6·042
Carbonate of Lime	·341
Sulphate of Lime	7·625
Chloride of Calcium	2·311
„ Magnesium . . .	13·148
„ Sodium	11·650
„ Potassium . . .	·150
Silicic Acid, etc.	·204
Total amount of saline matter	41·471 grains per gallon.

† 'Treatise on the Mineral Waters of Harrogate,' by J. Garnett, M.D., p. 105.

iron is dissolved by the muriatic acid." Dr. Hunter supposes Dr. Garnett refers to St. George's Well (a ferruginous spring now extinct), but as Dr. Garnett in the same book furnishes an analysis of St. George's Well, and if the water of that well contained iron dissolved in muriatic acid, it is singular he should not have mentioned it; is it not more probable that he had examined a small spring running to waste in the locality he describes? this, however, is supposing that a spring, containing protochloride of iron, originally existed in the immediate locality, but as the borings were made for the express purpose of obtaining *sulphur water*, they would hardly select the immediate neighbourhood of a chalybeate spring, and considering also the condition of chemical analysis at that time, much reliance can hardly be placed in this remark of Dr. Garnett's, unless confirmed by further evidence.

Another explanation of the change which Mr. Davis regards as the most probable, is that the source of the spring has, in the interval since 1854, become connected with another and a deeper one. The constant flow of the water through the strata which supply the constituents of the water must eventually render the strata more or less porous, and so will make communications with adjoining strata, and this is reasonable to suppose when we consider, that assuming that this spring discharges 12 gallons of water per hour, and calculating the saline ingredients as given by Dr. Miller, the quantity of solid matter will be 3 tons $2\frac{1}{4}$ hundredweight in a year, containing iron, which, if reduced to the metallic state, would weigh 179 pounds, and of chloride of barium, the new constituent, above 100 pounds. The former great variations as observed by Dr. Bennett, compared with the pretty constant results which have been obtained during the last eight or nine months, appear to favour this theory, and that this spring has only been in existence forty-seven years, may be a reason why this water has undergone a most extraordinary change, while the old sulphur well, which has run for ages, is subject to unimportant variations.

Several inquiries were made by members present, and replied to by Mr. Davis. The very great importance and interest of the subject were admitted by all, it being evident that the great changes shown to have occurred in this chalybeate spring must be going on to a greater or less extent in many other waters. The best thanks of the meeting were offered to Messrs. Holroyd and Davis.

YORK CHEMISTS' ASSOCIATION.

The Annual Meeting of the York Chemists' Association was held on Friday evening, February 2, 1866, at Beale's King's Arms Hotel, when the President, Mr. George Dennis, occupied the chair.

The Honorary Secretary, Mr. Councillor J. Brown, was called upon to read the Report for the past year, of the proceedings of the executive, which had been of an arduous and successful nature, the result giving satisfaction to the members. A resolution was proposed and unanimously agreed to, that the Report be received and adopted, and entered upon the Minutes of the Society.

The Balance Sheet and Accounts were produced and read over by Mr. Councillor Thomas Cooper, the Treasurer, showing the handsome surplus of £4. 3*s*. 6*d*. remaining to be carried to the current account of the year.

The thanks of the meeting were presented to the Chairman, Treasurer, and Secretary for their exertions on behalf of the members, which were appropriately acknowledged. The Committee and Auditors for this year were then appointed, and the annual dinner was arranged to be held on the 27th inst., at the King's Arms Hotel.

Annexed is a copy of the Report.

"*Annual Report of the York Chemists' Association.* 1865.

"Sir,—In this, the first Report of the York Chemists' Association to the members of the trade, the executive have pleasure in congratulating the members upon the success that has attended their exertions in the promotion of unity and harmony, as well as the influence it has brought to bear on the political action of the Pharmaceutical and United Societies.

"At the first meeting, held on the 20th of January last, to discuss the merits of the

Pharmacy and Chemists and Druggists Bill, after due and careful consideration neither of them were approved, but certain clauses and amendments were suggested and recommended for adoption to the rival Societies, whereby joint action might be secured, and an Act of Incorporation obtained from Parliament for the government of the trade, with the approbation and concurrence of all who are interested in it.

"A full account of this meeting and the resolutions adopted thereat was sent to the 'Pharmaceutical Journal' and the 'Chemist and Druggist' for publication, such publication having apparently had considerable influence on the opinions of the trade in all parts of the country; and the executive have much pleasure in reporting that the Editor of the 'Chemist and Druggist,' on several occasions, has commended the action of the York Chemists, and recommended other towns to follow so worthy an example.

"A copy of the Report and Resolutions was sent by your Honorary Secretary to Mr. Westhead and Colonel Smyth, our late representatives in Parliament, together with a letter strongly urging them to support our views in the event of either Bill being pressed through Parliament during the Session; replies were sent by both gentlemen, stating it would give them pleasure to attend to the interests of our important trade, should their services be required.

"Your executive were not content with these precautions, but, in order the more directly to gain for their opinions the consideration of the Government, it was thought advisable also to write to the Home Secretary, Sir George Grey, on the subject; accordingly the Report and Resolutions were sent, together with a letter containing additional reasons for the adoption of our views (which letter was also published in the 'Chemist and Druggist'), and your executive have reason to believe that these communications had considerable influence ultimately on the decision arrived at by the Special Committee.

"In order to use every constitutional means for the furtherance of our objects, a petition to Parliament was subsequently presented from this city by Colonel Smyth, signed by ninety-two chemists and chemists' assistants, praying that in any enactment affecting so respectable a body that equal privileges be given, and that the right of self-government should be maintained, and that no governing body or society could have our confidence who ignored these principles.

"Your executive gave every attention during the continuance of the Session to all measures affecting the interests of chemists and druggists, and, as is well known, all legislative action by the two Societies proved abortive. In the month of March, Sir Fitzroy Kelly introduced the Pharmacy, and Sir John Shelley the Chemists and Druggists Bill, which, after the second reading, were referred to a Select Committee. This Committee commenced its labours on the 5th May, taking evidence in support of the Pharmacy Bill until the 19th June, when it presented a Report to the House, recommending Government to introduce a Bill in the new Parliament founded on certain resolutions and recommendations that were almost identical with our own.

"After the experience of last Session, your executive have little hope of a successful measure being passed until the two Societies unite and agree to a scheme of Government satisfactory to the majority of the trade, and which, at the same time, will be beneficial to the interests of the public.

"In conclusion, it may be as well to notice that the dinner held on the 8th March last, and which was well attended, was so successful, that the executive most cordially recommend the members to have an annual festivity, in order to cement and strengthen the good feeling that meetings of that nature have a tendency to promote.

"It is recommended that the Committee and Auditors be elected at this Annual Meeting.

"Annexed is a statement of accounts for the past year, showing a balance in hand of £4. 3*s.* 6*d.*, which it is hoped will prove satisfactory:—

	£	*s.*	*d.*
"*Receipts.*			
"To Subscriptions, 1865	15	11	0
"*Expenditure.*			
"Printing, Stationery, Postages, Meetings, Petition, Annual Dinner, etc.	11	7	6
"Balance in hand	4	3	6
	15	11	0

"George Dennis, *Chairman.*
"Thomas Cooper, *Treasurer.*
"John Brown, *Secretary.*"

"*York, February* 2, 1866.

ORIGINAL AND EXTRACTED ARTICLES.

CHEMISTS' ASSOCIATIONS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The above subject having been brought into prominence by the failure of an attempt to organize a Chemists' Association at Birmingham, it seems to me that an appropriate and favourable opportunity is presented for a few relevant remarks, with a view, if possible, to "point a moral, or adorn a tale."

That "union is strength" all will admit, and that "knowledge is power" none will deny. After many years of hard work, on the part of the pioneers of pharmaceutical progress, these facts are beginning to dawn upon the trade. The process, however, is slow, tediously slow; and, even now, one could almost believe that were it not for the untiring exertions of a few (happily an increasing few) active, energetic, and powerful minds, the whole fabric of pharmaceutical progress would ignominiously fall to the ground. Such is the apathy of the trade—such the indifference to all but a certain forced and monotonous routine. If an apt illustration were required, it would be found at once in the listless and unsatisfactory condition of Chemists, and Chemists' Assistants' Associations. The work that is done is done by a few, and empty chairs and a sprinkling of silent members make up the rest. The introduction, even, of elements of a purely social character fails to bring with it the anticipated success. Why, then, should this be, amongst a body of presumably educated and intelligent men? Why should chemists and druggists feel so little interest in that which so nearly concerns them? Mr. Deane has told us that at the outset of his career he wisely determined that his business should afford him his chief pleasures. How few of us can say so much! How comparatively few of us there are, who derive any *real* or *genuine* pleasure from the prosecution of the life-task we have set ourselves to perform! We work well with our hands, it is true, (there is no alternative, and we cannot afford to be idle,) but our hearts do not respond. It is all stern, practical reality,—all unpoetical, dry, tedious work, behind the chemists' counter. Not, then, until we feel more interest in matters practical at home, shall we be likely to pursue with any zeal or enthusiasm the science and theory which invite our consideration elsewhere. And this, I imagine, is the chief circumstance or condition that stands in the way of our progress, and makes the able efforts of our best men so comparatively unavailing. We do not care much for the counter—we care nothing for the laboratory. And so we go on from day to day, because, forsooth, we are impelled on by the force of circumstances; our minds, in reality, seeking pleasure and profit from matters of a more congenial nature. Self-preservation and the desire for independence carry us on, not, as it should be, the love of our occupation, and the ambition to become "a help and ornament thereunto."

But to alter all this, and acquire the needful interest in our daily work, what must we do? We must make our business a *more attractive* one. We must lessen the hours of labour, close our doors on Sundays, and be less ready to compete for the the stray pence that may come in at unseasonable times. As things are now, we can only excuse ourselves on the plea that "our poverty, not our will consents." But can these suggested reforms be effected by any *direct* process with which we are acquainted? It would seem not. We have no choice, then, but to struggle on with things as we find them, falling back for our chief encouragement on the maxims with which we started, and feeling well assured they will prove triumphant in the end. It will be slow work—it will be hard work; but, happily, there are those with large minds and indomitable hearts, who are not discouraged by paucity of attendance or lukewarmness of support, and who see no obstacle in the way of progress and improvement. These are the men who will push forward and save the trade. These are the men who will free us (if, indeed, it is possible to do so) from the inexorable routine to which we are firmly chained, and thus engender in our minds that regard for our daily duties without which we cannot possess an adequate zeal for the prosecution of the higher branches of our profession.

Chemists' Associations are a step in the right direction. Union, organization, strength, knowledge, power—all these mean success, and something more. When, therefore, the failure of an attempt to organize and unite, is reported in the Journal, it cannot but be a matter of regret to all well-wishers of the trade; but though a discouragement for a time, it will detract nothing, as we may hope, from that one desideratum which is all but within our grasp, and in the possession of which (so uncertain and unsatisfactory is our position now) we shall be only too ready to feel and admit that "not another comfort like to this succeeds in unknown fate."

Let the Birmingham gentlemen try again, for although, as I have said, Chemists' Associations do not *flourish*, in the strict sense of the term, yet whilst they exist they offer an opportunity for friendly intercourse with our neighbours and colleagues, and add something to the progress of pharmaceutical science as revealed to us in conformity with the times in which we live. Apologizing for trespassing so largely on your space,

I am, Sir, yours obediently,

A MAJOR ASSOCIATE.

February 16, 1866.

P.S. I ought, perhaps, to say that *personally* I have no cause for complaint as regards the above, since the establishment in which I am engaged is closed at nine o'clock every evening, and we manage to make up a good and satisfactory return, without having recourse to that remorseless and cruel, but nevertheless intensely significant characteristic of our business, *Sunday trading*.

ON THE MANUFACTURE OF CITRIC ACID.

BY FREDERICK ROW, F.C.S.

As so little attention has hitherto been given to the manufacture of this and other organic acids by scientific men (probably on account of the small quantity annually produced), a few observations from practical experience may not be uninteresting.

The first point of importance in this manufacture is the defecation of the lime or lemon-juice imported, and from which almost all the citric acid of commerce is produced.

This juice contains, beside the citric acid, a large quantity of colouring-matter, mucilage, and other impurities, which in the ordinary method of working so contaminates the citrate of lime next produced as to render the subsequent solution, and also the crystals of citric acid, so impure, that repeated re-crystallization and re-saturation are necessary to render them fit for the market.

Hitherto it seems to have baffled the efforts of manufacturers to overcome this difficulty, and hence the great cost at which the acid is prepared; but the writer of this paper has found that when the concentrated juice is diluted to the same strength as the fresh juice (which contains about twelve ounces of citric acid to the gallon) that a great part of the mucilaginous and other impurities will separate by subsidence in a flocculent form, and the citrate of lime and also the citric acid produced from the juice so purified will be in a state of comparative purity.

Another very important point for consideration of the manufacturer is the way in which the solutions of these acids are evaporated; the sulphuric acid necessary to be in slight excess at first so accumulates in percentage by the repeated evaporation and crystallization of the citric acid out of the solutions, as to cause a most destructive action upon that remaining in the mother-liquors. Various means have been used to prevent this, the most successful being, doubtless, the substitution of water for steam heat during evaporation; but as the lower temperature requires longer exposure to heat, the advantage thus gained is almost counteracted.

The most effectual means of remedying this is by passing the mother-liquors, so soon as they are found to contain any dangerous amount of sulphuric acid, through a fresh portion of citrate of lime, which not only removes at once all free sulphuric acid contained, but there is also deposited a quantity of flocculent matter which was held in solution by it, and which is no doubt the cause of the mother-liquors when old crystallizing only with such difficulty. The flocculent precipitate referred to consists for the most part of sulphate of lime, but contains also some phosphate of iron and alumina, and accumulates more or less according to the care bestowed in evaporating the solution, it being most insoluble when the liquor contains about 6 lb. of citric acid to the gallon, marking 1200 to 1250 (according to temperature) on the hydrometer, and if not separated from the solutions at that point it partly dissolves again as they become more concentrated.

As a consequence of this, it is found necessary, in the usual working, to re-saturate these solutions so soon as they become surcharged with these matters and the sulphuric acid above referred to, and thus renew the whole process continually, which of course necessarily increase greatly the expense of working, as well as loss both in time and material; but when the process of purifying referred to is adopted, it is found practicable to work continuously with the same liquors without saturating (of course depending upon the amount of carefulness in the manipulation), and in such case the cost of production is lessened nearly one-half. The crystals of citric acid also being most tenacious of sulphate of lime will often hold it so as to render them contaminated even to the second or third crystallization, producing an opacity which when dried gives them an appearance of efflorescence; materially affecting their commercial value.

This difficulty, which is also, in the opinion of the writer, to be overcome, will form part of a future paper.—*Chemical News.*

SALE OF ALCOHOL FOR MEDICAL AND CHEMICAL PURPOSES.

A question of importance to photographic and other chemists has just been decided. It seems that an excise officer bought some strong alcohol of Messrs. Horne and Thornthwaite, and then laid an information against the firm. Messrs. Horne and Thornthwaite thereupon wrote to the Commissioners of Inland Revenue, stating that in 1856, when supplying the photographic outfit to the Royal Engineers, they had, through the late Captain Fowke, inquired of the Board whether they were allowed to sell alcohol for photographic or scientific uses, and the reply given was to the effect that no notice would be taken of such sale. Messrs. Horne and Thornthwaite also urged that the spirit supplied by ordinary dealers was useless for scientific purposes. They stated, further, that they were of opinion that they were fully justified in selling an alcohol the strength of which is so high that it cannot be tested by Sikes's hydrometer, as such an article could not have been contemplated by the Act, which directs all spirits to be tested by Sikes's hydrometer; and they concluded by appealing to the Commissioners, on their own behalf and the many other establishments interested, to decide what they might legally sell. The reply of the Commissioners will be found below. We may add that Messrs. Horne and Thornthwaite have been advised not to sell alcohol under 60° over proof, and in quantities of not more than one gallon at a time.

"*Inland Revenue, Somerset House, London, W.C.*
"*30th January*, 1866.

"Gentlemen,—The Board of Inland Revenue having had before them your application of the 17th instant, I am directed to state that the law absolutely prohibits the sale of any spirit without licence, but that this department is not in the habit of interfering with chemists who sell small quantities of highly rectified spirits, such as cannot be procured from ordinary spirit-dealers, for medical or scientific purposes only.

"I am, Gentlemen, your obedient servant,
"ADAM YOUNG, Assistant-Secretary.

"*Messrs. Horne and Thornthwaite.*"

GOVERNMENT PHARMACY IN INDIA.

BY EDWARD NICHOLSON, F.C.S., STAFF ASSISTANT SURGEON, CANNANORE.

It is undeniable that, of late years, the acquaintance of the British medical profession with the remedies they employ has decreased in proportion to the growing separation of the practice of medicine and of pharmacy. Not that the separation of the doctor's consulting room from the druggist's shop is in any way to be deplored, yet every one practically acquainted with professional routine at home must acknowledge that the old system of the medical student passing a few years in the dispensary was of great benefit to him, and that those practitioners who, under more recent regulations, have not been obliged to make a closer acquaintance with drugs than that implied by one session's attendance on a course of materia medica lectures, often find in themselves, and betray to others, a lamentable deficiency in the art of prescribing.

When we consider how nugatory is the greatest diagnostic skill of the physician if he be unprovided with appropriate remedies, or unfortunately ignorant of the way to remedy by medicines the disease his knowledge of the art of medicine has taught him, surely the theory and practice of pharmacy, as well as a thorough knowledge of materia medica, must be considered essential. Nor is it to him who has taken the speciality of medicine to whom pharmacy is alone necessary; the surgeon requires at least as complete an acquaintance with the resources of pharmacy as with the practice of operative surgery. One of my teachers, who, though a most excellent surgeon, was, through unsteadiness of hand, anything but a first-rate operator, nevertheless was a more successful surgeon than many of his colleagues, more skilful in operating. The reason was simple; a man of varied scientific attainments, he had been a very successful physician and chemist before changing to the surgical branch of the profession. The consequence was, that in cases of operation, his happy after-treatment far more than compensated for his slight manual deficiency in operative skill. He did not consider his responsibility ended when the hernia had been released, or the calculus removed; a watchful eye and a sound knowledge of pharmacy steered the patient in the many dangers through which he had to pass.

A feeling of gratitude for the man who taught me not to follow the too common fashion of making a dog-Latin prescription of drugs one knows nothing about, the sole result of medical skill, has led me to this digression, yet I could never sufficiently repeat how necessary to the doctor is a perfect knowledge of the tools he uses in his work.

But of little use will be the most happily composed prescription if the art of the prescriber is to be marred by subsequently pharmaceutical ignorance, by the employment of bad drugs, or by the drugs not being procurable. These are contingencies which rarely occur at home in civil practice, but of frequent occurrence both at home and in India in the practice of the Government medical officer. Nowhere more than in the army, does there exist a complete listlessness and happy-go-lucky system about the pharmaceutical arrangements. In the French service the qualified *pharmacien*, like the qualified surgeon, has to undergo a course of instruction at the Army Medical School before he can become qualified for employment, and the regularity and efficiency of the pharmaceutical branch of the medical department is kept up by pharmaceutical officers of the various inspecting ranks. How the pharmaceutical department of the British service is managed I cannot say; I only know that my inquiries on the point have had no result, and the only apparent system is that there is no system. The drug department seems to be utterly unworthy of attention, except when the drug-bill is to be paid, and the apparent absence of system would be borne out by an inspection of any Government dispensary at home or in India.

I will show that my remarks are not unfounded. In the 'Hospital Regulations' (a work of which there seem to be few copies in India, and which is a dead letter here), there are three pages (Section XXIII.) devoted to the subject of Surgical Instruments, Medicine Chests, and Medicines, in which there is not a word about what medicines are supplied, or under what system they are chosen, or how their good quality is guaranteed. A form is given for requisition of medicines and drugs, but no information is given as to what other drugs are allowed beyond the scanty list afforded. In fact, there are no pharmaceutical arrangements.

I am but little addicted to polypharmacy, and prefer, for my own part, trusting to a few medicines whose action I know well, to elaborating wonderful prescriptions in very bad Latin of newly-invented drugs. But few medicines as I generally use, I was fairly astonished on entering the service at the poverty of the "surgery." It was not so much the poverty that astonished me as the poverty and riches intermixed. The numerous half-gallon bottles of quinine contrast most curiously with the shabby array of "præparata ex ferro." Citrate of iron, sesquioxide of iron, and sulphate of iron are all the martial preparations,—three salts of iron, including a preparation of red ochre. At least one would think that the pharmacopœial preparations would be allowed, considering the facilities at home for procuring them. But such is not the case. I remember at Fort Pitt, the head-quarters of the medical stores, prescribing some linimentum æruginis in a gargle. The prescription was returned; I endeavoured to adapt it to the resources of the establishment by substituting for the pharmacopœial liniment a prescription of verdigris, vinegar, and honey. That was as unsuccessful; there was no ærugo in store; thus I was obliged to renounce in disgust any prescription more far-fetched than a black draught, or a dose of castor-oil. At the same time quack medicines, such as Warburg's Tincture, Browne's Chlorodyne, Boudault's Pepsine, could be had in any quantity, and the value of the quinine used exceeded that of all the other drugs put together.

One thing, however, I must say for the Home Service, that the instruments are generally of very good quality. Would that I could say the same of those supplied to India!

My agreeable surprise on seeing the first page of an Indian indent for medicines was rather tempered on coming to the end by finding that liberality in the number of medicines was amply compensated by the small number of useful medicines; and I found, before I had been long in India, that small as is the number of useful medicines allowed, smaller still will it have dwindled by the time the indent has passed the purging of the Division Office and the Medical Stores. I have watched the fate of the different medicines in the indent, and on comparing my indent with the Medical Storekeeper's invoice, the missing drugs are numerous indeed. Curiously enough, pepsine, quinine, chlorodyne, copaiba, pil. hydrarg. seem to have charmed lives, while the fatal red-ink dash and the black "none in store," fall heavily on the salts, the iron, and the opium. Of course regulations must be abided by, and extravagance should be checked; still an impartial examination of the indent shows that a very few ounces of quinine would have paid for many of the pennyworths so ruthlessly expurgated.

There is a 12 oz. bottle of quinine in my surgery; the cork has been untouched for months, and shall remain untouched as long as it is under my care. Its value is at least 30 rupees, yet I would willingly exchange it for 4 annas worth of nitre. Of what use is the valerianate of zinc, the pepsine, and other drugs, as expensive as their value is dubious, when I cannot get the drugs to relieve a common case of fever. However, such is the case. A certain permanent settlement seems to have been made in the drug department, under which every medical officer is expected to find every year, in every corps, the same diseases, and to treat them in the same manner.

So much for the system of indenting for medicines. What shall I say of the instruments? The less said the better; but between certain instruments which might be mistaken for the "apparatus" of Frère Côrne or Paracelsus, did they not bear the name of Evans, Old Change, and those of Savigny, there is really nothing to choose. I can only say that Savigny, or his successors, Whicker and Blaise, would not dare to show in their shop the vile instruments sent out to India.

The contemplation of a case of tooth instruments marked with V. R. I. excites feelings of the profoundest sympathy for the wretched men whose jaws are to be tortured by these brutal instruments.

Three patterns of cases seem to be extant; I have all three, and will describe them. A common feature pervades all,—the multiplicity of keys and claws, and the paucity of forceps. On opening my capital case, I find a powerful key provided with three claws, two elevators of fearful construction, and two mis-shapen pieces of iron intended for forceps. The jaws of one are straight, in the other they are crooked, otherwise they possess the common character of simply terminating in three jagged points, roughened like a carpenter's pincers. No word can express their utter inaptitude for any purpose. In the other cases there is a greater number of instruments, but no more variety. The number of keys and claws is greater, but the forceps are of very similar construction.

Not one contains a forceps for either lower molars or bicuspids. The key is a barbarous instrument, for before one can use it with anything like safety, a dozen teeth or jaws must be broken in experiments. A completè set of tooth forceps can be purchased in London for about thirty shillings, yet I will warrant that not one of the infamous cases supplied to the Indian Government cost less than double that sum.

Where are these drugs and instruments generally kept? In some small room, fitted with one cupboard and a few shelves, for the delectation of the rats. The tinctures are in clumsy wine bottles, mostly minus their labels, extracts in gallipots with a piece of rotten leather faintly covering the mildewed mass within, powders in what are termed mustard and caper bottles. The shelves are loaded with brown-paper parcels of long-ago rotten drugs, and anything like order seems unknown. Some dismay is at first created by the alarming labels of "Poison," written in all the languages of Southern India, but the effect intended is completely marred, when it is found that liq. arsenicalis and carbonate of ammonia both bear the same placard. With these flaring yellow "Poison" labels, the "Surgery" looks somewhat like Morrison the hygeist's representations of an allopathist druggist's shop, and the patients must be very much edified by the way in which they are served out "Poison" all round. I say "served out" intentionally, for each patient does not usually get his medicine given him out of his own bottle. The more common practice, where there few patients in hospital, is to make up each dose as required. It seems to be one of the comical Indian ways of saving trouble.

In this description I have merely stated what I have seen, and it falls very far short of the reality. Lavish expense on articles of questionable utility, expensive instruments of the worst possible quality, lamentable deficiency of the ordinary and cheap medicines, waste of stores through want of proper dry places to keep them in, disorder, and dirt, such are my impressions of a Government "Surgery" in this Presidency.

I propose a reform of this system.

1. I know not how the stores are procured from England, or what measures are taken to get good articles at a reasonable price. I can only take cognizance of the stores on their arrival in this country.

They should, on receipt, be rigidly examined. It would be well worth while for Government to entertain a medical officer competent in chemistry and pharmacy, for the sole purpose of examining the stores, and suggesting such measures of economy as the resources of this country permit of introducing. Many important medicines might be made in this country at one quarter of the price they cost Government at present.

2. A proper list of drugs and stores should be made out, modified from time to time as necessary. Quack medicines should be rigidly excluded, but every medical officer has most certainly a right to employ any drug authorized by the British Pharmacopœia. This should be recognized as a principle.

3. A fair scale of medical stores should be drawn np, adapted to corps, etc., of different strengths. Besides a margin for unusual expenditures of medicines, of six months' extra supply, a certain amount of raw drugs might be added to meet contingencies. Thus, if towards the end of the year a medical officer's stock of tr. opii for eighteen months were all exhausted, he might fairly be expected to make a tincture with his reserve stock of opium and country spirit. Catechu, cinnamon, and other articles of the materia medica, might similarly be provided for the purpose of making preparations, if necessary.

4. All drugs should be contained in proper vessels. Consideration should be had for the climate. For instance, nothing ought to be kept in paper parcels on the western coast. I have known a 2 lb. parcel of pulv. zingiberis become completely tasteless in less than a month after its receipt. The practice of sending jalap, rhubarb, ipecacuanha, etc., in paper parcels, is simply throwing away valuable drugs. Every drug sent from the stores should be, whenever possible, packed in a vessel which will contain it conveniently on the dispensary shelves. Gallipots with leather covers are quite inadmissible. Proper extract-pots, with well-fitting lids, should be provided. Bottles for fluid drugs should be provided in every dispensary, properly labelled, as they would be in any practitioner's dispensary at home.

5. The Dispensary should be properly fitted up. A cupboard for instruments and miscellaneous stores, a cupboard for poisons, and a proper set of shelves, in a good light, should everywhere be provided. Bottles for the wards should be provided in fair proportion; not the ordinary sort, requiring the detestable label, "Two tablespoonfuls," etc.,

but of the sort divided into four, six, and eight parts, so that the dose can be accurately measured from the bottle. They cost no more than the plain sort.

6. An efficient dispenser should be provided. This would be best done, according to the British system, of encouraging the Hospital Sergeant to learn dispensing. On his proving himself efficient, he gets one shilling a day extra pay. The Hospital Sergeant is generally a trustworthy man, and for many reasons I have every reason to believe that he is by far the best sort of medical subordinate for the army. The time is come when the Medical College should devote its energies to educating men for practice amongst the natives of India, and not to giving a medical education to men whose real employment in the army is to be office-work, writing and copying the tedious and voluminous reports of the Indian Medical Department.

Were encouragement given by Government, Provincial Medical Schools might be instituted for the education of natives, with, I believe, very happy results. If in every large cantonment the medical officers were to give instruction to such natives as had attained a certain proficiency in English studies at the Government Schools, granting licences to those properly qualified, I believe that much good might be done. At the same time facilities might be afforded for procuring medicines from the Government Stores, on payment. We should not then have that hole-and-corner way in which natives can often alone get relief, necessitating the troublesome stock and expenditure book. Gratuitous relief to natives from dispensaries ought to be abolished. Before many years, it will become as great a nuisance as the hospital system is in England. The medical education of a number of intelligent natives, and their distribution in districts, would do much to attach the natives to the British rule. A certain small salary from Government for attendance on the indigent, and for vaccination, would secure the services of a qualified native doctor in every district, and he might attend, at a certain tariff, such well-to-do people as required his services.

But for this to be possible, Government must act liberally to medical officers, which it seems very far from willing to do at present.

The recent publication of the British Pharmacopœia affords an excellent opportunity for reform in the Pharmaceutical department of the Madras army, and it is earnestly to be hoped that something will be done to insure an ample supply of good drugs and stores to regimental hospitals, and, at the same time, to put a stop to the waste now taking place.—*Madras Quarterly Journal of Medical Science.*

REMARKS ON THE PREPARATION OF LIQUOR BISMUTHI.

BY ALBERT E. EBERT.

This subject was introduced by Mr. C. R. C. Tichborne, (Lond. Pharm. Journ., Jan. 1864,) and was thoroughly investigated some months later by Mr. N. Gray Bartlett, who communicated the results of his examination to this Journal (Jan., 1865). Since the appearance of the latter paper, an article was published by Mr. Thos. P. Blunt, (Lond. Pharm. Journ., May, 1865,) in which Mr. Bartlett's process was declared unsatisfactory, though at the same time a formula was submitted which, in all essential points, was but a reproduction of that of Mr. Bartlett. Subsequently, a rejoinder, by Mr. Tichborne, appeared (Lond. Pharm. Journ., June, 1865), reiterating his former statements, which had been disputed, and suggesting another method of preparing liquor bismuthi. This consisted in dissolving crystallized ternitrate of bismuth in water, adding a due proportion of citric acid, and neutralizing the liquid with ammonia. These papers, instead of further elucidating the subject, have left it in such a state of uncertainty, that many may be deterred from attempting the preparation of liquor bismuthi.

The large demand which has followed the introduction of this solution, and the evidences of favour with which it has been received, convince me that it is of too much value to be allowed to fall into discredit through fallacious formulas or the disputes of inventors.

After a series of carefully-conducted experiments with the different processes, I have arrived at the following conclusions:—

1. Teroxide of bismuth, though recently precipitated, is but sparingly soluble in citrate of ammonia, even at the boiling temperature. The presence of a portion of nitrate of ammonia, through insufficient washing of the teroxide, will effect a solution.

2. A neutral solution of citrate of bismuth, obtained by means of citrate of ammonia and ammonia, or by ammonia alone, of such strength that a fluid drachm contains one grain of teroxide of bismuth, is prone to decomposition. This change is not attended by the deposition of a basic salt, but by the formation of humus: the liquid acquiring, meanwhile, a disagreeable smell and taste, which totally unfit it for use.

This is prevented by the addition of alcohol, whereby it is preserved indefinitely. A concentrated solution appears to keep well without this addition of spirit.

3. Mr. Blunt's assertion that, by Mr. Bartlett's process, a large loss of citrate of bismuth is incurred, is erroneous, and must have arisen from the employment of nitric acid, sp. gr. 1·5 (Ph. Br.), instead of that of the sp. gr. 1·42 (U. S. Ph.). Another inaccuracy occurs in the direction, to "add solution of potassa until the mixture is only faintly acid;" before this point of saturation is reached, the precipitate, first formed, will be entirely redissolved. When only sufficient potassa is added to neutralize the nitric acid, the citrate of bismuth is precipitated: an excess of the alkali over this quantity *dissolves* the citrate of bismuth, the solution still having an *acid* reaction. Even when the potassa is employed in atomic proportions, the yield of citrate of bismuth is *no larger* than is obtained by precipitation with citrate of potassa. The process recently suggested by Mr. Tichborne (before alluded to) I consider highly objectionable, because of the presence of nitrate of ammonia. A little more than one grain of the latter salt being administered with every grain of teroxide of bismuth, such an addition could scarcely fail to interfere injuriously with the therapeutical action of the bismuth. Though I have employed Mr. Bartlett's process many times, and with uniform success, I prefer a modification of it, embodying the idea of Mr. Blunt, *i. e.* in dissolving the citric acid in the solution of nitrate of bismuth, and adding a sufficient quantity of potassa to exactly saturate the nitric acid employed, the advantage being that the citrate of bismuth thereby produced is more readily washed, and is more rapidly and completely dissolved by ammonia.

The process is as follows:—

Take of Subcarbonate of bismuth, 1 troy oz.
Citric acid (in powder), 420 grs.
Nitric acid, sp. gr. 1·42, $1\frac{1}{2}$ troy oz.
Pure caustic potassa, 450 grs.
Distilled water,
Alcohol, each, a sufficient quantity.

Dissolve, by gradual addition, the subcarbonate of bismuth in the nitric acid, and, when effervescence has ceased, dilute the solution with $1\frac{1}{2}$ fl. oz. of distilled water; now add the citric acid, and stir until it is dissolved. In 8 fl. oz. of distilled water dissolve the caustic potassa, and add this gradually to the acid solution. Permit the mixture to stand for six or eight hours, then transfer to a moistened paper filter, and wash the precipitate until the washings no longer contain nitrate of potassa. Transfer the still moist magma to a dish, and add, very gradually, water of ammonia until the precipitate is dissolved, and a neutral solution is obtained. Dilute this solution with an equal volume of distilled water, and treat $\frac{1}{2}$ fl. oz. of the liquid with hydrosulphate of ammonia, in slight excess; wash the precipitate on a tared filter, dry on a water bath and weigh. Multiply the weight of the sulphide of bismuth by the fraction ·908, to determine its equivalent in teroxide of bismuth. Apply the same ratio to the remainder of the liquid, and dilute it to such an extent that 1 fl. drm. shall contain 1 gr. of teroxide of bismuth, $\frac{7}{8}$ of which measure must be made up with distilled water, and the remainder with alcohol. The average product of liquor bismuthi, from 1 troy oz. of subcarbonate of bismuth, was 50 fl. oz., indicating a loss of bismuth amounting to 7·6 per cent.

This loss is occasioned by the slight solubility of citrate of bismuth in the washings, and though this portion may be recovered, it is too small in amount to compensate for the time and trouble necessarily expended in its separation.—*Amer. Journ. Pharm. January*, 1866.

EXPERIMENTS ON THE COMPOSITION OF WHEAT GRAIN.

BY A. H. CHURCH, M.A. OXON., F.C.S.,

Professor of Chemistry in the Royal Agricultural College, Cirencester.

The influence of season, climate, manure, etc., upon the composition of wheat grain, has engaged the attention of many scientific observers. MM. Boussingault, J. Pierre, and Reiset, abroad, and Messrs. Lawes and Gilbert, in this country, have added several important facts to our knowledge of the variations in the yield and quantity of corn under different conditions of culture and atmospheric influence, and also according to the particular variety of seed grown. There were still several points to be cleared up, and it is to one among these that my attention has been more particularly directed since the autumn of 1863. It is the relation of the density of the seed to its chemical composition, and to its germinating and productive powers, that I have submitted to an experimental investigation. The first portion of my results has been already published,* and a brief account of those more recently obtained may prove of interest to the readers of the 'Journal of Botany.'

Most samples of dressed wheat-grain, if carefully examined, will be found to consist partly of hard, horny, subtranslucent grains, partly of softer opaque floury grains, and partly of grains presenting a mixed aspect. I have specially examined two varieties of wheat, and the proportions of the three sorts of grain which my samples contain are given here in percentages:—

	Spalding red wheat (1864).	Hallett's white rough chaffed (1865).
Translucent	49 per cent.	24 per cent.
Medium	34 ,,	31 ,,
Opaque	17 ,,	45 ,,

These proportions fluctuate, however, even with the same variety of wheat under the various conditions of season, maturity, when cut, etc. It is not, however, these proportions that I wish to discuss, but a remarkable difference in composition between the translucent and the opaque grains. I am aware that previous observers have detected certain chemical differences between the poor shrivelled grains and the full plump grains. But the grains which I find to offer a most striking contrast as to the proportions of their most important constituent, present no striking contrast in size, shape, or weight. In Hallett's white wheat, for instance, the 24 translucent grains weigh 19 grs.; the 45 opaque grains weigh 34·2 grs. Had the opaque grains been of exactly the same density and size as the translucent grains, their weight would have been 35·6 grs. instead 34·2—a very trifling difference, due not only to a difference in the size of the two sorts of seed, but to a slight difference in density in favour of the translucent grains. This difference in density is brought out very plainly when the seed is placed in a strong solution of chloride of calcium under the air-pump. With the solution of specific gravity, 1·247, 71 per cent. of the grains sink, 29 per cent. float. In 100 of the heavy grains thus separated there are generally 35 to 38 translucent grains, and only 18 opaque; while in 100 of the light grains thus separated, there are usually only 10 translucent grains, and as many as 70 opaque grains. With these observations on one physical distinction of importance between the two sorts of seed, I may introduce my experiments on their chemical differences.

The amount of water in the selected seeds was practically the same:—

Percentage of Water.

	Spalding red.	Hallett's white.
Translucent	16·12	14·34
Opaque	16·10	·47

But the percentages of nitrogen were remarkably different:—

* 'Practice with Science,' part i. p. 101. Longman, 1865.

Percentage of Nitrogen.

	Spalding red.	Hallett's white.
Translucent	1·792	2·088
Opaque	1·405	1·521

It is usually assumed that the percentage of "flesh-formers" or albuminoids in feeding-materials may be deduced from the percentage of nitrogen by multiplying it by 6·25. According to this calculation, we find the percentage of albuminoids in the translucent grains of Hallett's white wheat to be 13·06, while in the opaque grains it is only 9·51. In Spalding red wheat, the flesh-formers in the translucent grains amount to 11·20 per cent., and to 8·78 per cent. only in the opaque grains. Assuming the medium grains to be intermediate in composition, it is easy to calculate what amount of nitrogen the whole wheat would contain. The calculated and experimental percentages of nitrogen are—

	Spalding red.	Hallett's white.
Percentages of nitrogen calculated	1·598	1·745
" "	1·600	1·752

The chief conclusions at which I have arrived from my experiments previously published, from those recorded in the present note, and from others not yet made known, may be briefly summed up as follows:—

1. In a sample of wheat the translucent grains contain much more nitrogen than the opaque, but the same percentage of water.

2. The translucent grains are denser than the opaque.

3. A larger proportion of the opaque than of the translucent grains germinates and fruits.

4. The yield of dressed corn is greater from the denser seeds, and this dressed corn, from the greater perfection of its grains, is itself denser.—*Journal of Botany.*

HYPOSULPHITE OF SODA IN DIPHTHERIA.

Mr. J. C. Maynard, of Wisbeach, in a communication to the 'Medical Times and Gazette' of December 30, records the successful treatment of diphtheria by hyposulphite of soda. The cases treated by Mr. Maynard, in conjunction with Dr. Tubbs, were about fifty in number, all of which, with the exception of one, were cured. The plan of treatment pursued was as follows:—

"On first visiting a case, if not very far advanced, and in which only a few spots are visible, the throat is dressed twice a day with a strong solution of the hyposulphite of soda—viz. ʒiij of the hyposulphite, glycerine ʒij, with ʒvj of water. This generally removes the incipient exudation in forty-eight hours, sometimes in less. But if the case is an advanced one and the parasitic plant is making rapid strides, we wash the throat well out with warm water by means of one of Maw's flexible syringes. This is alike agreeable and most beneficial to the patient. The affected parts are then dressed with the strong solution, and a gargle of ʒss of the hyposulphite to half a pint of water, with ʒss of glycerine, is given to be used every hour.

"In cases of very young children, where it is difficult to dress and get at the throat, we give the hyposulphite internally, from gr. j to gr. iij every four hours, and allow them to swallow the gargle, which, by the way, they very frequently do without permission. Dr. Tubbs informs me he is now giving to adults gr. viij every four hours."

ON ANÆSTHETICS.

BY J. M. CARNOCHAN, M.D., SURGEON IN CHIEF TO THE STATE EMIGRANTS' HOSPITAL, NEW YORK, ETC. ETC.

I desire to present, through the pages of the 'Medical and Surgical Reporter,' a general statement of the facts respecting three surgical operations which I performed, using nitrous oxide gas, administered by Dr. Colton, as the anæsthetic, and my opinion on the value of this agent as compared with chloroform and ether.

The first operation took place on the 22nd of last July, and was the removal of the entire breast and glands of the axilla, for cancer. The patient, a lady in feeble health, was suffering from disease of the throat and lungs and general debility. In thirty-five seconds from the time she began inhaling the gas, she was in a profound anæsthetic sleep. She remained insensible for sixteen consecutive minutes, until the operation was completed, and in forty seconds, from the time the bag was removed, awoke to consciousness without nausea, sickness, or vomiting, as is so often the case with the inhalation of chloroform and sulphuric ether.

The second and third capital operations occurred at the State Emigrants' Hospital, on the 2nd of December, and consisted of two amputations of the leg. The time required to produce an anæsthetic sleep in the first patient, a male adult, extremely debilitated and worn out by disease, was forty-five seconds; whole duration of the operation and influence, two minutes and a quarter. No nausea or unpleasant symptoms.

The third operation was on a boy of about thirteen years of age. The time consumed in the inhalation, operation, and recovery from the anæsthetic sleep, was two minutes, the gas working equally as in the other cases, and the patient, after complete anæsthesia, awaking entirely free from unpleasant symptoms.

For minor operations, or for capital operations, such as amputations, which, when properly performed, should require but a few minutes, I have no hesitation in stating that the nitrous oxide gas, as an anæsthetic, is far superior to either chloroform or ether. Insensibility is suddenly produced, and the patient recovers consciousness quickly, the operation being attended by no nausea or sickness, and without the dangerous effects often incident to chloroform and ether.

It is worthy of remark, that the nitrous oxide gas approximates, in its chemical combination, to the composition of the ordinary atmosphere, and we may thus, inferentially, account for its more favourable influence. Whether it can be used in operations which from their nature require from half an hour to an hour's time, remains still to be proved by actual experiment.

The duration of the anæsthetic influence in the case of the first operation, previously alluded to, is the longest on record; and I may here state that this is the first capital operation performed under the influence of the gas, since the great discovery of Wells of Hartford, twenty-two years ago, that a harmless sleep could be produced by a chemical agent, which could annul for the time being the greatest suffering. It is not at all improbable that had Wells lived and had the boldness to follow up his early successful experiments, chloroform and ether would never have been thought of as anæsthetics.

To G. Q. Colton is due the credit of reviving the use of this important agent, in the practice of dentistry, after a lull of twenty-two years.

The value of a safe anæsthetic agent, which can be used without anticipation of danger by the patient, is a great boon to suffering humanity; and I have related thus minutely its action in my own cases, in the belief, that if similar favourable results are met with by others, the nitrous oxide gas will supersede all other anæsthetics now in use.—*Canada Medical Journal.*

APPEARANCES OF GOOD AND BAD MEAT.

Dr. Letheby, in a report on the cattle plague, gives the following characters of good and bad meat, which are especially interesting at the present time:—

"Good meat is neither of a pale pinkish colour nor of a deep purple tint. The former is indicative of disease, and the latter is a sign that the animal has died from natural causes. Good meat has also a marbled appearance from the ramifications of little veins of intercellular fat; and the fat, especially of the internal organs, is hard and suety, and is never wet; whereas that of diseased meat is soft and watery, often like jelly or sodden parchment. Again the touch or feel of healthy meat is firm and elastic, and it hardly moistens the fingers; whereas that of diseased meat is soft and wet,—in fact, it is often so wet that serum runs from it, and then it is technically called wet. Good meat has but little odour, and this is not disagreeable; whereas diseased meat smells faint and cadaverous, and it often has the odour of medicine. This is best observed by cutting it and smelling the knife, or by pouring a little warm water upon it. Good meat will bear cooking without shrinking, and without losing very much in weight; but bad meat shrivels up, and it often boils to pieces. All these effects are due to the presence of a large proportion of serum in the meat, and to the relatively large amount of intercellular or gelatinous tissue; for the fat and true muscular substance are to a greater or less extent deficient. If, therefore, 100 grains of the lean or muscular part of good meat are cut up and dried at a temperature of boiling salt and water (224° Fahrenheit), they lose only from 69 to 74 grains of their weight; but if diseased meat is thus treated, it loses from 75 to 80 per cent. of its weight. I find that the average loss of weight with sound and good beef is 72·3 per cent., and of mutton 71·5 per cent., whereas the average loss of diseased beef is 76·1 per cent., and of diseased mutton 78·2 per cent. Even if it be dried at a higher temperature, as at 266° Fahrenheit, when all the moisture is expelled, and when good meat loses from 74 to 80 per cent. of its weight, the proportion of loss in bad meat is equally great. Other characters, of a more refined nature, will also serve to distinguish good from bad meat. The juice or serosity of sound flesh is slightly acid, and it contains an excess of potash salts, chiefly the phosphate; whereas diseased meat, from being infiltrated with the serum of blood, is often alkaline, and the salts of soda, especially chloride and phosphate, abound in it. Lastly, when good meat is examined under the microscope, the fibre is clean and well-defined, and free from infusorial creatures; but that of diseased meat is sodden, as if it had been soaked in water, and the transverse markings are indistinct and far apart; besides which, there are often minute organisms like infusorial bodies. These are very perceptible in the flesh of animals affected with the cattle plague, and Dr. Beale has described them as entozoa-like objects. They differ altogether from the parasites which constitute the trichina disease, and the measles of pork. How far the use of diseased meat affects the human constitution is unknown. In those cases where certain parasitic diseases exist in animals, there is no doubt of its injurious nature; for the tape-worm, the trichina, and certain hydatid or encysted growths are unquestionably produced by it. Experience also points to the fact that carbuncle and common boils are in some degree referable to the use of the flesh of animals affected with pleuro-pneumonia; and occasionally we witness the most serious diarrhœa and prostration of the vital powers after eating diseased meat. It is, therefore, safest to forbid its use; and it is at all times best to guard against the possibility of injury by having meat well cooked. It should be so cooked that the very centre of the joint should be exposed for some time to the temperature of 212° Fahrenheit. The instructions of Liebig in this particular are hardly safe; for although a temperature below that of boiling water may coagulate albumen and develope the flavours of cooked meat, it may not ensure the destruction of dangerous parasites. It is therefore better to have the meat a little overcooked than otherwise."—*Chemical News*.

NEW ARTIFICIAL MARBLE AND CEMENT, MADE WITH MAGNESIA.

M. Sainte Claire-Deville has lately made an interesting discovery and a series of experiments, which may lead to important practical results. The investigation originated in an observation of the effect produced by water on a sample of magnesia obtained by the calcination of chloride of magnesium. This anhydrous magnesia, in compact fragments, says M. Deville, was left for several months in a current of water running from a tap in his laboratory at the École Normale, and finally assumed a remarkable consistency, having the density and more than the hardness of marble. When divided into rather thin pieces, it became translucent, like alabaster, and the interior of the mass was crystalline. At the end of six years, during which time it was exposed to the air, no change took place in its condition. When analysed, it was found to contain—Water, 27·7 parts; carbonic acid, 8·3; alumina and iron, 1·3; magnesia, 57·1; and sand, 5·6. M. Deville pulverized some of this substance and mixed it with water, till he produced a semi-plastic mass, and he then left it for several weeks in a tube containing distilled water deprived of gas by boiling, and enclosed in a glass tube hermetically sealed. The magnesia combined slowly with the water, and became as compact and as hard as the first-mentioned specimens. The desiccation caused by exposure to the air caused it to become crystalline and translucent. Some medals were cast with this new substance, treated like plaster, and they assumed under water the appearance of mastic. A mixture of chalk or marble with pulverized magnesia, made into a slightly plastic paste with water, is said to mould well, and to assume extreme solidity under water. M. Deville proposes to apply this substance to busts, and hopes to produce a very valuable kind of artificial marble. But another and far more general and important application of the discovery is that of the making of cement. M. Deville calcined a quantity of dolomite, rich in magnesia, at 300° to 400° centigrade, less than dark red heat, mixed the powder with water, and tried the product as a cement. Experiments have been made with this cement in salt water, and they are reported to have been eminently satisfactory. M. Deville's reputation as a chemist gives great importance to this communication in a theoretical point of view. The only question, therefore, that remains to be solved is the cost of the new artificial marble and cement, as compared with those at present in use.—*Journal of the Society of Arts.*

ON THE POSSIBILITY OF MANUFACTURING NEROLI IN THE BRITISH COLONIES.*

BY J. E. DE VRIJ.

When on my way to Java, in the month of October, 1857, I passed through the South of France, my attention was fixed by the large number of orange-trees cultivated in the neighbourhood of Cannes, Grasse, etc., for the purpose of manufacturing néroli, which fragrant essence is exported from the southern parts of France, and from Italy, to England and other northern countries. The high price of this essence induced me to inquire if it would not be possible to manufacture it in the colony where I was going to reside for some years.

A few month after my arrival in Java I fortunately had the opportunity of putting my idea into practice. In Bandoug, the town where I lived, which is situate at an elevation of about 2300 feet above the level of the sea, I was struck, in the months of October and November, by the fragrant smell of orange-flowers, which perfumed the whole neighbourhood. Upon inquiring the cause, I found there existed in that part many thousand shaddock trees (*Citrus Decumana*) whose flowers were the cause of the fragrance. This fact appeared very curious to me, for although the fruit of the good kind of shaddock is one of the most delicious fruits in the tropic, this is only true when the tree is grown in very warm localities, as in the neighbourhood of Batavia, situate almost at the level of the sea in about 6° south latitude.

In higher localities, like that of Bandoug, where the average temperature is much lower than in Batavia, the fruit of the shaddock has only the size of an ordinary orange, and is not eatable. As the many thousand shaddock-trees growing in the neighbourhood of Bandoug were therefore almost useless, I thought it interesting to make some experiments on the preparation of the essence of shaddock flowers. This seemed the more interesting to me as I found the shaddock-tree growing at an elevation of about 4000 feet, producing an abundance of flowers. The fact that I once collected from one tree in my garden not less than 200 lbs. weight of flowers proves the abundance of flowers that may be obtained under happy circumstances.

I must mention that the wood of the tree is very hard, and acquires a beautiful yellow colour; it may also prove to be of some value.

After a great many distillations of several hundredweights of fresh flowers, the result was that the average quantity of essence yielded by 1000 lbs. weight of fresh flowers was 1 lb.

Having ascertained the amount of product, the following question arises:—Is the essence obtained by me from the *petala* of the shaddock-trees identical with the essence of orange flowers called néroli? The result of my experiments in this direction was, that the two essences are really identical; which conclusion was afterwards confirmed, upon my return to Europe, by the principal manufacturers of perfumes, whom I consulted on this subject, and who declared the essence of shaddock flowers prepared by me to be identical with first-rate quality of néroli.

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* Read before the British Association.

Another question of importance also arises:—Would the manufacture of néroli in the tropical countries pay? This can only be answered by practical experience. In Java, where I made my experiments, the local circumstances are such that the manufacture would certainly pay.

But besides the néroli obtained by distillation of the flowers, there remains in the still after the distillation a substance which deserves attention, if ever my plan of preparing néroli in the tropical colonies should be carried out. If the residue in the still is thrown, yet boiling, upon a cloth, the clear yellowish liquid which passes through the cloth deposits after a few days a large amount of yellow crystals. My experiments with these cystals have proved that they are identical with the substance discovered, in 1828, by Lebreton, in unripe bitter oranges, and called by hlm "hesperidine." This hesperidine, which I find very widely spread in the genus *Citrus*, is the pure bitter substance contained also in orange-peels. As this hesperidine is a pure and quite innocent bitter substance, which can be obtained easily, and in tolerably large quantities, from shaddock flowers, it deserves, perhaps, attention as a substitute for hops.

NEW SOURCE OF BISMUT

The supply of bismuth has never been an abundant one, and latterly it has not been equal to the demand, so that any new applications of the metal, of which several might be suggested, have been limited by this cause. It appears, however, that an increased supply may now be expected. In the 'South Australian Register,' of the 27th of September, it is stated that a bismuth mine has been discovered, Spencer's Gulf, in that colony, which is being vigorously worked, and is likely to prove valuable.

PROHIBITION OF THE USE OF GUN COTTON FOR ARTILLERY BY THE AUSTRIAN GOVERNMENT.

It appears that the Austrian Government, by whom Gun Cotton was first effectively introduced in the army, have recently prohibited its further use by the artillery and corps of engineers. It is stated that a large number of guns that had been made for use with gun cotton have been ordered to be recast.

BEE BREAD AS A DIURETIC.

Dr. Jas. S. Whitmire states (the 'Chicago Medical Examiner,' September, 1865) that he has found the bee bread to be a most powerful diuretic. He made the discovery accidentally. Having bought a quantity of honey in the comb, he feasted liberally on it with his family for four or five weeks, and noticed that his secretion of urine was largely increased. Fearing that his kidneys were diseased, he examined for albumen without finding any, and afterwards for sugar by the taste, when the taste of bee bread was detected, and its odour was also distinct. He then learned that his family was similarly affected.

To verify his suspicion as to the cause of his increased urinary secretion, he selected, he says, "some of the oldest comb that contained the greatest quantity of the bread, and separated it from the honey and comb; then, after abstaining a week from the use of my favourite sweet, and getting quite over my renal disease, as well as my unnecessary alarm, I partook of the bread, without the luxury of the honey, to the extent of ʒj three times per day, when, as I was expecting, back came the enormous secretion, but this time producing an entirely different effect upon my mind, so that I was now prepared to investigate the effects a little more at length. I continued taking ʒiij per day, for about a week, during which time I voided from four to six fluid pounds per day, the difference being the *greatest when I was at some out-door exercise. When I remained quiet,* in my warm office, there was from a pound to a pound and a half less secretion than when exercising. I also repeated the same experiment on my children, and found, to my entire satisfaction, that this article possesses most valuable diuretic powers, and there seemed to be no disagreeable symptoms following its use, excepting a slight degree of flatulency and a looseness of the bowels produced, the latter of which is, not unfrequently, very desirable, particularly in dysuria, where there is irritation of the neck of the bladder and urethra, or, even in strangury, where there is absolute inflammation of the urinary passages. This, to me, is the more evident, from the enormous quantity of urine secreted, and, consequently, any irritating quality that it might contain would be so diluted as to be rendered entirely mild and inoffensive to the delicate structure of the urinary passages.

"One advantage this article has over many others of its class is, that it is entirely palatable and inoffensive to the stomach, producing no irritation or nausea of the latter organ."—*Amer. Journ. Med. Science.*

NEW PAPER MATERIAL.

M. Caminade has taken out a patent in France for manufacturing paper from the roots of the lucerne plant. When dried and beaten, these show thousands of very white fibres, which form an excellent pulp for paper-makers, and may be substituted with great advantage for rags. The three species of lucerne, *Medicago media*, *M. falcata*, and *M. maculata*, produce equally good roots for paper-makers' use. M. Rabourdin, an experienced agriculturist, states that the month of December is the best time for taking up the roots of the plant. The earth is then moist, and a great part of the root can be easily drawn. In the months of January or February following, a harrow may be drawn over the land, and the remainder will then come to the surface. The roots are then to be well washed and delivered to the paper-makers. The pulp produced is said to be equal to that of ordinary rags. The roots are to be first pressed between two rollers to open them, and when sufficiently crushed and dried, they are left to soak in running water for fifteen days or three weeks. The pulp, besides the fibre for paper, produces salt of soda and a colouring matter, called by the inventor "luzerine." It is calculated that France produces annually seventy-five million kilogrammes of paper, of which one-seventh is exported, leaving not more than two kilogrammes for each inhabitant. It is consequently inferred that the production of paper would increase considerably, were it not for the scarcity of the raw material. It requires one pound and a quarter of rags to make one pound of paper. Rags are eagerly sought for by every nation where paper is manufactured, hence this warm competition makes rags scarce and dear. M. Lafon, of Candaval, considers that the *Arundo festucoides*, which grows abundantly in vast tracts of land in Algeria, might be much more utilised than it is for paper material. At least twenty or thirty millions of hectares are covered with this plant. While rags cost from 270 to 300 francs the ton, the pulp made with this wild plant might be sold with advantage at one-third of this price. Dr. O'Rorke, after alluding to the employment of this plant by the ancients, thinks that paper made with this pulp would want consistence; but M. Lafon refutes this objection by furnishing paper made of it, which is tough and offers great resistance.—*Technologist.*

EXTRACTS FROM MINUTES OF EVIDENCE GIVEN BEFORE THE SELECT COMMITTEE ON THE CHEMISTS AND DRUGGISTS BILL.

(*Continued from page* 72.)

Sir Fitzroy Kelly.] 456. I must ask you, with regard to medical prescriptions, are they generally by medical men both in the metropolis and in the provinces, in this country, in Latin?—Invariably.

457. Then, when you say in English also, are you referring to anything; are you aware any description of prescription is in use except the ordinary Latin prescription

by physicians and surgeons, and other medical men?—Hundreds of domestic prescriptions, more commonly called "receipts."

458. I mean the prescriptions of medical men; are you aware of any class of medical men throughout England or Scotland, physicians, surgeons, or otherwise, regular practitioners in medicine, who deliver prescriptions otherwise than in Latin?—Very rarely, indeed.

Sir Fitzroy Kelly.] 459. It would be quite an exceptional case?—Quite.

460. Then, when you speak of the ability practically to understand medical prescriptions, you mean the prescriptions in Latin such as are ordinarily given to patients, by the regular practitioner in medicine?—Yes.

461. Both in England and Scotland?—Quite so.

475. Now, with regard to the examination; do you think that amply sufficient (I am always speaking now of the Minor examination); do you think that Minor examination, as adopted by the Pharmaceutical Society, to be amply sufficient to secure that degree of competence and knowledge which is necessary to the safety of the public with regard to the compounding of medicines?—Quite sufficient.

476. And the dealing with prescriptions?—Quite sufficient.

479. You do not think there would be any undue restrictions in the freedom of trade and commerce, and the liberty which every man ought to enjoy, provided it does not interfere with the public safety and the public good; you think, with a view to these considerations, it is too severe or stringent?—I do not think it is; seeing that masters of vessels and engineers are required to be examined, lawyers and clergymen also, I do not see why there should not be some examination for those who have to deal with matters affecting the lives of the subject.

480. You think there would be nothing unreasonable in requiring that any man who is to be trusted in making up Latin prescriptions or compounding medicines in conformity with Latin prescriptions; you think there would be nothing undue in the interference with the freedom of trade and commerce?—Not so far as I can see. It must be remembered that there are outlying places which could scarcely support a man who had gone through a lengthened course of study and examination. There ought to be great judgment exercised in these restrictions.

481. With reference to that answer, have you any suggestions to offer as to how, practically, you could at once secure the public by requiring a certificate that the chemist has undergone this examination, while I yet leave open the door in remote parts of the kingdom, and where the population is very limited, to somebody or other practising, but who yet may be trusted to compound medicines according to Latin prescriptions?—With regard to that there is this to be considered. There would at once be a wide field thrown open for all to be admitted to registration; that would effect an abundant supply for the present; and, if this examination be kept low, or to a limited extent, and there be sufficient time given to young men and others to prepare for it, I do not think there will be any great hardship.

484. As I understand you to say that kind of examination as administered by the Pharmaceutical Society would be sufficient, and no more than sufficient, you have hitherto directed your attention to the consideration of these examinations having reference to the compounding of medicines in prescriptions. Now, allow me to ask you, with regard to the sale of poisons, do you think it is or is not necessary for the safety of the public, before any chemist or druggist should be permitted to deal in poisonous substances,—that is, articles having poison in them that might be fatal to life if swallowed,—to impose any restrictions, by way of examination, upon persons before they should be permitted to deal with such articles?—I think that the retail trade in poisons ought not to be undertaken by any persons except those who have passed that examination.

487. You would apply the examination to all persons who are to be at liberty to compound medicines according to prescriptions, and to all persons who sell in retail poisons or poisonous substances?—Articles that could be used for poison. Of course, a list of those poisons should be given.

492. If the character of the examination and amount of the fee are to be substantially and always under the control of the Secretary of State, you would say there would be no danger in the monopoly?—No.

493. Would you see any danger in entrusting the whole of the conduct of the examination to the Pharmaceutical Society by means of the present examiners?—Not the least.

494. Are you aware, by the present constitution of the Pharmaceutical Society, it possesses great facilities, without further experiment or proceedings, for administering this examination?—Nothing can be better than all its arrangements.

495. They have examiners, all appointed?—Yes.

496. They have had a long experience themselves, and have, also, for a long time been in the habit of administering this examination?—The Pharmaceutical Society has sought, by the character of its arrangements, to obtain the high character it has succeeded in obtaining. Dr. Pereira and Dr. Thompson, its original examiners, as well as their successors, are men who have filled the highest position in science.

497. Would you also place the appointment of future examiners (the present examiners we will assume to be sufficient); would you make the appointment by the society of future examiners, as these die off or retire, to be subject to the approbation of the Secretary of State?—I should have confidence in the council of the Society.

498. If any doubt existed on that point, would you see any advantage?—I think it could not be well done by the Secretary of State.

499. If they are about to appoint A, B, and C as new examiners, from two or three others having ceased to act in that capacity, and it was necessary to submit those names to the Secretary of State, do you think there would be any difficulty or danger arising from that, or would there be sufficient security?—I should not fear any such danger.

Chairman.] 500. The Secretary of State would have very little control over the appointment of examiners, the name would be simply submitted to him?—That is all.

Sir John Shelley.] 501. Following up that question of the chairman, should you advise that in order that the Secretary of State should have some power, one or more members of the Medical Council should be appointed by the Secretary of State to act on the council or with any board of examiners?—A simple assessor, whose sole duty it should be, would be better.

502. I understand from your evidence that you are decidedly of opinion that examination into the qualification of a chemist and druggist is required?—Quite so.

503. Your evidence has principally gone towards persons dispensing drugs under prescription?—Compounding and dispensing; I think the compounding of drugs generally in use is quite as important as the mere dispensing of prescriptions.

504. Some of us are laymen in this matter; what would you include under the word "compound?"—There are, for instance, all the preparations in the Pharmacopœia. Chemists, moreover, find, for example, that certain salts or other matters are more soluble in one substance than another; take tannic or gallic acid; he finds there can be made a solution in glycerine which becomes a very useful application, but the mode of making which would never suggest itself to his mind; whereas the chemists who are daily dealing in these articles prepare and submit them to the physicians. There are many things of that kind where the educated pharmaceutist will prepare compounds and submit them to the physician for his approval and use.

506. Take any district that may be selected at a distance from a large town or a large village, ten miles from a large village; would the answer you have given in reference to this question of examination apply to the small shopkeeper of a small place, looking to the interest of the public?—When a small shopkeeper undertakes to make up a prescription, and to keep a quantity of poisons, he ought to be obliged to pass the examination I have in view.

513. Looking at the state of society, what would you do with regard to the counter, —the man who sells over the counter that which is required day by day by the poor, and which can hardly be called in common parlance a dangerous drug; would you require a person selling castor oil?—That would not be in the schedule.

514. How do you do with a person who sells over the counter castor oil, rhubarb, and those things; do you require examination or registration, or anything?—Not the least, not the slightest.

523. May I take it generally, you are so impressed with the necessity of the protec-

tion of life, that you are prepared to recommend this Committee to legislate to the extent of putting persons to the inconvenience you have alluded to for the sake of restricting the sale of poison ?—I am quite sure it is desirable for the safety of life.

524. With regard to the Pharmaceutical Society, may I ask you, are you aware of what it is constituted ?—Yes, I have followed its history.

525. Are you aware of who are the examining body ?—Yes.

526. Are you aware that, with regard to the examining body of the Pharmaceutical Society, a great portion of them have not been examined themselves ?—Yes, quite aware of that.

527. Would you say that at this moment of the trade of chemists and druggists throughout the country and particularly of the large towns ?—There are.

528. But persons carrying on the trade of chemists and druggists, who are quite as competent to know the use of medicine as some of the examiners in the Pharmaceutical Society ?—That I do not doubt.

529. Do you think, looking at that answer which you have given, that it is right to call on a man who, we will say, lives at Manchester or Leeds, and who has carried on a large business as a chemist and druggist, who is highly respected, and who is up to his work as well as anybody in London, to call on him to register, and have a certificate given to him by persons not a bit better qualified than himself ?—He is only required to go through a mere form ; to send his name, with a small fee.

530. Put yourself in the position of that man, would you like it ?—I had to do it when the Medical Act passed ; I had to register, and pay £2 as a fee.

531. But then you were admitted to some voice in the management of the society ?—Not at all.

544. Will you tell us whether the Pharmaceutical Society has succeeded in extending its roots and branches into the country generally ?—I do not know, and cannot say.

545. You do not know of your own knowledge ?—I only know that wherever they are, they are very much respected.

546. You would think, would you not, whatever body it was that was appointed under legislation to be the ruling body, in this case should, as far as possible, have power and influence throughout the country at large ?—I do not think that is essential to it.

555. I think you stated you thought those who carried on the trade of druggists ought not to be authorized to prescribe ?—They ought to be required not to prescribe, not systematically to prescribe.

556. Supposing I was to go into a druggist's shop and say, "I have a sore-throat, I wish you would give me something that might be useful ;" when he prescribed a gargle or something of that kind, it should not be allowed ?—The suggestion I made was, that the chemist should not be engaged in the treatment of diseases and injuries systematically, which is a different thing from giving such general advice as a friend might give.

557. Poor people go to a druggist's shop ?—Yes ; it is the systematic going out and visiting and treating diseases at home which is injurious to the public.

Lord Elcho.] 619. As regards danger to the life in the making up of prescriptions, no doubt the knowledge would be desirable of the properties of the different drugs, but I do not see how the knowledge that one drug is a poison and the other is not would give safety to life against the purchase of those drugs for malpractices ?—I think the person, knowing the characters of poisons, would think much more of selling them than the man who merely sold them as a matter of trade.

620. Now, in a village, suppose I intend to purchase poison to administer to somebody, and ask you for so much arsenic, how would the knowledge whether you have it or have it not prevent my purchasing that, and entering a false character with it ?—I think if a man knew that arsenic was poisonous (I refer not to arsenic alone, but to other things) that he himself would make his own police regulations, and use the fullest precautions.

624. Generally speaking, I gather from your evidence you think the *caveat emptor* principle of legislation would be a first step and a safe one ?—To a great extent it would be.

Mr. Ayrton.] 664. Are there not some cases, not inconsiderable, in which medical men write prescriptions in a way which leads to mistakes, such as morphine instead of opium?—There are very many cases, I confess, as a physician, where well-educated Pharmaceutical Chemists may have opportunities for correcting the mistakes made by physicians writing, for example, in a hurry, or when disturbed by being spoken to whilst writing.

665. Physicians and surgeons are apt to make mistakes, are they not, in the modes in which they write prescriptions?—They are liable to do so.

666. And if not corrected they lead to calamities?—Decidedly.

Dr. Brady.] 667. That would show the necessity of having Pharmaceutical Chemists better educated?—Yes.

Mr. Ayrton.] Do you think it desirable that Pharmaceutical Chemists should be well educated in assisting physicians and surgeons in conducting their business?—A well-educated Pharmaceutical Chemist would be and should be of immense value to physicians in curing their patients, by supplying them with good material.

669. Is that one of the leading purposes for which you would have them examined? —That is one of them.

682. In the case of a chemist, he is only to sell the commodity, and the purchaser takes it with his own risk; do you see any analogy in that case and the case of a clergyman being tested for the purpose of accepting an endowment?—If the captain of a ship or an engineer is examined, or if a barrister or a clergyman is examined, before either can become a clergyman or a barrister, or perform the functions of a captain of a ship, each is obliged to submit to some examination as to what his knowledge is; therefore, I think, applying the analogy, it is quite fair to ask that a chemist, who deals in drugs which affect health or life, should be examined.

691. And at the same time I understand you to say, the person who so sells them must be strictly prohibited from using or applying those drugs for the use or benefit for which they are sold?—I did not say strictly prohibited; they should not be engaged in medical or surgical practice systematically.

692. That would prohibit the person who sells the drug from suggesting the use of it?—A man may know that opium would check diarrhœa, but he does not know what the nature of diarrhœa is, and consequently may not know in what cases to use it.

693. If you require this examination into the knowledge of the use with which the drugs are to be applied, would you not give the man the right of prescribing the use or application of the drug?—He is taught what doses are, but not when to give them, or why; he is taught merely what drugs are.

694. You would keep him strictly within the limits of the mere sale of the drugs, without allowing him to interfere with the application of them?—He otherwise would be doing what he is really not competent to do: he may be able to prescribe for a sore-throat, or to give a dose of aperient medicine, but it would be impossible for him to undertake the treatment of disease, for which the Committee must admit that a special education is essential.

698. Is it the practice of surgeons to make up their own prescriptions?—They are endeavouring to get rid of that habit.

699. In the country?—It must be done there, because it is very difficult to find chemists everywhere; but, where it can be done, the practitioner is keeping aloof from the dispenser in his practice.

700. What advantage is there to society in this division of labour?—In the greater improvement in the character and properties of drugs, and in the practitioner charging for visits and not for medicine.

704. Is there not an obvious distinction in the compounding of those which are not dangerous to life and those which are?—Simples, by being compounded, may become dangerous.

705. Do you think the restriction is sufficient, if it is limited to the compounding and selling, simply, or as compounds, poisonous substances?—I think simples may be sold; but compounding drugs should be by those who know what they are about. It would be for the public good.

Dr. James Arthur Wilson, examined.

Sir Fitzroy Kelly.] 891. Will you let me ask you whether, in your judgment, the public require some protection by legislation against the incompetence and ignorance of chemists and druggists?—In my opinion, yes.

892. Do you think that a protection to the public may be secured by subjecting chemists and druggists hereafter to an examination?—I think the protection should be more than it is at present. There would be no absolute protection against accidents; but, answering generally, yes.

893. Do you think it is necessary or fit to legislate on the subject, so far as to subject all future chemists and druggists to an examination before he shall be permitted, as a chemist and druggist, to compound medicines?—Yes.

894. Are you aware of the kind of examination which is administered to chemists and druggists by the Pharmaceutical Society?—I have not attended the examinations, but I am aware of their general character.

895. Do you think it is sufficient for the purpose?—I have in my hand the programme of the two examinations, the Minor and the Major. I have made one or two pencil notes. I do not think the Minor examination, in one or two respects, quite sufficient for the purpose.

896. When you say, "in your view for the purpose," for what purpose; you have considered the Minor examination, to which alone I will solicit your attention; you think that Minor examination, in one or two particulars, is not sufficient for what purpose?—For the purpose of protecting the public as far as possible against mistakes in compounding medicines, and in the general business of the shop.

897. What are those one or two particulars?—The only decided remark I should make is this: it is more an omission than a fault of the examination. In the Minor examination, under the head of "prescription," I would have introduced the clauses No. 2 and No. 3 of the corresponding division in the Major examination, *i. e.*, "Detecting unusual doses," and "knowledge of doses generally."

898. You would extend the Minor examination in the detection of doses?—Yes, in the knowledge of doses generally.

899. With that kind of emendation, do you think the Minor examination sufficient for the purpose you have mentioned?—Yes, I do.

900. Now, let me ask you, do you think it more than sufficient, too stringent, or calculated in any way to interfere with the freedom of trade, the liberty that every man ought to enjoy to carry on his trade without restriction, as far as it is consistent with the public safety?—I do not think so.

901. And you do not think it too stringent or too severe?—I do not.

902. Are you aware of any other board or body of examiners in existence to whom you would commit the task of examining persons as to their qualification for chemists and druggists, except the Pharmaceutical Society?—I am not aware of any board.

903. Have you visited the premises of the Pharmaceutical Society?—Yes, I have.

904. Have you seen the general nature of the institution?—Yes, I have.

905. Do you think, from your observations, and founded on your experience, they are a perfectly competent body or board to superintend this examination for the whole trade of chemists and druggists in the kingdom?—Remarkably competent; more than the public had any right to expect, I should say. The development of the Society has surprised me.

ACCIDENTAL POISONING BY MORPHIA.

An inquiry was commenced on Saturday, February 3, at Fort Monckton, Gosport, before E. Hoskins, Esq., coroner, respecting the death of John Spooner, aged thirty-three, paymaster-sergeant in the 12th Brigade Royal Artillery. From the evidence of the wife of the deceased, it appeared that the day previous to his death he took some medicine which he had obtained from the hospital. About four o'clock in the morning he got out of bed, lit a candle, and took a dose of the medicine, observing at the time that it did not taste like the last. At a quarter to five witness was awoke by his groans, and tried to wake him, but could not. She then went for Dr. Gascoigne, who used all the means in his power to restore animation, but without success. The delivery of the medicine to Mrs. Spooner was proved by Charles Windsor, who obtained it from Sergeant Harding, by whom it was dispensed. Dr. Gascoigne deposed that he had at various times prescribed for the deceased, who was a sickly man. The last prescription was for a mixture composed of nitrate of bismuth, mucilage, and water. When called by Mrs. Spooner to see her husband he found an eight-ounce bottle of medicine, out of which an ounce and a half was gone. From its bitter taste he thought it was no prescription of his, and he afterwards examined it, and found it to contain morphia. From the symptoms he had observed, and from the *post-mortem* examination of the body, he was of opinion that deceased died from an overdose of morphia. Dr. Gascoigne stated that the hospital surgery was under the care of Sergeant Harding, who was considered a careful dispenser. The bottles in the surgery were clearly labelled. The morphia bottle and the bismuth bottle were of the same size, but of different shapes. The inquiry was adjourned for the purpose of having an analysis made of the mixture, and of the contents of the stomach, by Dr. Taylor. The inquiry was resumed on Monday, February 19th, when Dr. Taylor gave the following evidence:—On Thursday, the 8th instant, there were delivered for analysis at the chemical laboratory, Guy's Hospital, by Superintendent Hornigold, some articles which were examined by me, and which are specified and detailed in the report made by me, which is as follows:—1. A stoneware jar, sealed and labelled, containing a human stomach; 2. An eight-ounce medicine bottle, also sealed and labelled, containing a colourless liquid; 3. Three small phials (two of blue glass and one colourless), containing liquids, also sealed and labelled, with the doses of each medicine. 1. *The Stomach.*—This organ had been cut open and tied. It had been placed in spirit, about five ounces of which were collected and reserved for analysis. The lining membrane of the stomach was free from any appearance of disease, excepting a few patches of redness, which may have resulted from chronic inflammation of the stomach. The coats were firm. The stomach and the liquid in which it was immersed were treated with the usual tests and processes for the detection of poison, and a small quantity of morphia was found to be present in them. Morphia, it may be observed, in destroying life, produced no well-marked changes in the stomach. 2. *The Eight-ounce Bottle.*—This was labelled as a bottle of medicine, "Two tablespoonfuls one hour before meals," with the name of "Sergeant Spooner." The bottle contained five ounces of a colourless liquid, without smell, but of a slightly bitter taste, neutral in reaction, opaque and frothy when shaken, showing the presence of some gummy or mucilaginous matter. There was a thick, heavy white sediment at the bottom of the bottle. The mixture did not become clear after standing for a week, but the sediment had increased during this time. The liquid contents of the bottle and the sediment were examined separately. By the usual chemical tests and processes the liquid was found to contain morphia, a gummy substance, and a mineral preparation in small quantity—namely, a compound of bismuth. The sediment consisted in great part of oxide of bismuth, with a small quantity of morphia. Out of thirteen grains of sediment there were ten grains of bismuth and three of morphia. In the liquid portion the morphia was partly dissolved and partly suspended, owing to the presence of the gum or mucilage. Two separate examinations of this liquid were made by different methods, in order to determine the amount of morphia present. A tablespoonful was found to contain from two to three grains of morphia; hence, in two tablespoonfuls there would be from four to six grains of morphia, so suspended by the gum or mucilage as to favour its absorption by an empty stomach, and its rapid operation as a poison. A person taking this dose would speedily become insensible, and probably die in a few hours. The liquid contained no trace of quinine. The gum or mucilage in it may be regarded as an innocent preparation, and the bismuth, the greater part of which was in the sediment, was not in sufficient quantity to produce any ill effects. The oxide of bismuth found in the bottles is a safe medicine, and is much used in cases of indigestion arising from chronic disease of the stomach. As the morphia in this liquid is more suspended by the gum than actually dissolved, the deceased, in taking two tablespoonfuls, may have taken more morphia than is above stated. As the mixture had been made and probably shaken shortly before the dose was taken, the quantity of morphia contained in two tablespoonfuls may have been larger; but the amount of morphia present, after the mixture had stood for twenty-four hours, was quite sufficient to account for the death of any adult person taking the dose marked on the label of the bottle, *i. e.* two tablespoonfuls; indeed, one grain of morphia is sufficient to destroy the life of an adult. I have reported four instances in which death has been caused by this dose. If the person taking the drug is in a bad state of health, *i. e.* suffering from a disease of the lungs or liver, it is probable that its poisonous effects would be increased.; but, under any circumstances, the life of the strongest and most healthy adult might be destroyed if he took two tablespoonfuls of this mixture. 3. *The three small Phials.*—These were marked respectively "chloric ether," "dil. sulphuric acid," and "laudanum." There was but a small quantity of liquid in each phial. They were tested, and found to contain the liquids indicated by the labels. The doses as there marked are proper, and are capable of acting as medicines, and not as poisons, on the body. I have subsequently made analyses of two powders forwarded in sealed papers to me in a letter, one marked "bismuth nitrate," and the other "sulphate of quinine." I examined both of them minutely; there was no morphia in either; they were the medicines indicated by the labels. I believe I have understated the quantities of morphia, as I find in the residuum of the gum mucilage there is a certain portion of morphia existing. I have heard the deposition of Dr. Gascoigne read. The quantity of morphia found would represent about thirty grains in the mixture; the bismuth prescribed was forty grains; there were not more than ten grains of bismuth, and it does not correspond with the amount prescribed. There appears to have been no morphia prescribed. I am quite clear that deceased died from the effects of morphia, producing insensibility and death by coma. The appearance of the pupils confirms the conclusion.—By Sergeant Harvey: How much morphia do you suppose to be contained in the eighth part of the bottle?—Dr. Taylor: Taking a proportion of four grains to the ounce, and eight ounces in the bottle, would make thirty-two grains.—Sergeant Harding: What quantity do you suppose deceased took?—Dr. Taylor: From four to six grains in the dose; it might have been more. This closed Dr. Taylor's deposition, after which the coroner (E. Hoskins, Esq.) summed up the case to the jury, pointing out that if they believed the medical testimony, supported as it had been by the scientific analysis of perhaps the most celebrated chemical analyst of the day, there was no doubt that deceased died from the administration of a large quantity of morphia; that it mattered not that the deceased was at the time in impaired health, as the testimony of Dr. Taylor was positive as to the death being occasioned by morphia. Then came the consideration as to by whom that morphia was administered, and the evidence also seemed clear on that point that Sergeant Harding mingled the contents of the bottle containing the mixture. If satisfied on these two points, then two circumstances arose for their consideration. Was it done wilfully or unintentionally? On that point they had the testimony of Mrs. Spooner herself, that she did not know of any ill-feeling existing towards the deceased on the part of either Sergeant Harding or any one else. If, however, they (the jury) thought there was any evidence of such malicious motive on the part of Sergeant Harding, then the offence would be, undoubtedly, murder. The next point was, was it done inadvertently? And here he must remark that the law clearly was, that if a man entrusted with the performance of such duties as Sergeant Harding performed those duties *negligently*, then if death ensued in consequence of that negligence the offence was manslaughter. In this case it could hardly be supposed that a man could, except by exhibiting gross negligence, mistake (even if he did not refer to the labels upon them) a round-shaped bottle for a square, and therefore inadvertence could hardly be a proper term to apply to it. If, as he thought they might fairly do, they dismissed from their minds the idea of wilful intention, they would have to say—did the deceased die from the effects of morphia administered by Sergeant Edward Harding, and was it so administered in the negligent performance of his duties or not? He hoped they would take all the evidence into their consideration, and return a verdict in accordance with it. —The jury, after upwards of two hours' deliberation, returned the following verdict:— "That the said John Spooner came to his death by the administering by mistake of a dose of morphia instead of bismuth by Hospital-Sergeant Edward Harding, and therefore we say it was homicide by misadventure." They desired to express the opinion that they considered it their duty to suggest that in all dispensaries a special place be set apart for medicines fatal in small doses, and that it is absolutely necessary that, in all cases, properly qualified persons be appointed to dispense medicine, whose undivided duties should enable them to devote their entire attention to the subject.

MISCELLANEA.

Death from Drinking "Brandee."—An inquest has been held at Leeds on the body of Emma Longfellow, a child eight weeks old. It appears from the evidence that the deceased was attacked with diarrhœa, and her mother obtained from Mr. Jacob Naylor, druggist, a pennyworth of methylated spirit, called "Indian Brandee," which was recommended to her for the complaint referred to. She gave the child a dose on the Saturday night, another on Sunday morning, and a third between four and five o'clock on Monday morning; about half-past eight on the same morning the child was found dead in bed. Mr. Brameld, surgeon, who made a *post-mortem* examination of the body, was of opinion that death had resulted from congestion of the brain, caused, or at all events accelerated, by the methylated spirit. The druggist stated that he obtained the spirits from Mr. T. S. Naylor, manufacturing chemist, Hunslet, and that he was advised to use it in cases of diarrhœa; he had since destroyed his stock of the article. The inquiry was adjourned for the purpose of having the "Brandee" analysed, and to procure the attendance of the manufacturer.

Poisoning by Prussic Acid.—Dr. Lankester held an inquiry on Tuesday evening, February 20, at the Western Dispensary, Marylebone Road, respecting the death of William Hesketh, aged forty, porter at that institution, who, as appeared from the evidence, died from taking prussic acid by mistake for an ordinary mixture. The deceased had a bottle of medicine made up, which he placed in a cupboard where the poisons were kept. On Sunday morning last, he went, as was supposed, to take some of the medicine, and drank from the bottle containing the prussic acid. The mistake was made known to the resident surgeon, Mr. Shore, by whom an antidote was administered, but the deceased shortly afterwards fell back and expired. The two bottles, it seems, were very close to each other, the one containing the poison being labelled; the contents of both were colourless. The *post-mortem* examination bore out the cause of death as stated, and the jury returned a verdict of "Death from prussic acid accidentally taken."

Suicide by Essential Oil of Almonds.—The following case is recorded in the 'Manchester Examiner.' On Monday, Nov. 27, an inquest was held at Bolton to inquire into the cause of the death of a young woman, named Catherine Joyce, a domestic servant, aged 24, who died suddenly on the previous Friday. Mr. W. E. Whitehead, confectioner, Deansgate, said deceased came into his service as a domestic servant, on the 12th of August last. On Friday night he discharged deceased from his service without notice, paying her a week's wages in advance. She appeared much distressed in mind in consequence. Witness had missed some money out of the shop-drawer, and called the deceased and three other servants together, and told them some money was missed out of the till, and asked if any of them knew anything respecting it. They all denied any knowledge of it. Witness afterwards consulted Mr. Harris, superintendent of police, and his advice, under the circumstances, was to discharge deceased without giving any specified reason. During the time she had been in witness's service she had been accustomed to purchase a poison known as "almond-flavour." She had purchased that article for them during the week. Deceased had been informed that almond-flavour was a poison, and the bottle containing it was labelled "poison." Deceased had always done her duty up to the time she was discharged in a most satisfactory manner. Mr. Thomas Goodman, druggist, said between 8 and 9 o'clock on Friday night a woman came to his shop and purchased some almond-flavour. He never saw her before. When he purchased "essential oil of almonds" it was not a poison, being purchased free from prussic acid; but it generated prussic acid by age. Essential oil of almonds contained from 8 to 14 per cent. of prussic acid, but before he purchased it it was freed from prussic acid by some process. Jonathan Fell, labourer, residing in Back Garden Street, said that about twenty minutes to 9 o'clock on Friday night, he was going up Kay Street, and saw deceased going along the street. She flung something from her mouth. She was staggering at the time, and shortly fell to the ground. Witness went to her assistance; she was foaming at the mouth, breathed quick, her hands clenched, and was groaning. She was quite insensible, and was removed to a beerhouse adjacent, but died before she reached there. Dr. Steele proved that death was the result of an overdose of prussic acid. Essential oil of almonds was always poisonous, and he had never heard of it being sold without containing prussic acid. The jury found that the deceased committed suicide while in a state of temporary insanity, advising Mr. Goodman always to put poison label upon essential oil of almonds in future.

Suicide by Essential Oil of Almonds.—An inquest has been held by Mr. W. Payne, Coroner for the City, on the body of Miss Sarah Marks, who, from the evidence given, appeared to have been in good health up to the time she heard of the loss of the ship 'London,' on board of which was her sister. She then became quite frantic with grief, reproaching herself for having persuaded her sister to go to Australia. On the Sunday she did not make her appearance, and about midday the police were called in, and her room-door was broken open; she was found on the floor quite dead. On the table was a bottle labelled, "Essential oil of bitter almonds—Poison," and on a piece of paper was written, "that she had destroyed her life, as she was the cause of her sister's death, by persuading her to go to Melbourne in the 'London.'" Medical evidence was given, to the effect that death was caused by taking a large quantity of essential oil of almonds, and the jury returned a verdict, "That the deceased committed suicide by taking poison while in an unsound mind."

Poisoning by Oil of Vitriol.—On Tuesday, January 23rd, an inquest was held on the body of Matthew Milner, about six or seven years of age, the son of a coppersmith residing at Stratford. It appeared that on Monday morning he entered the workshop, and drank, in mistake for beer, a mixture containing oil of vitriol. The child was found in a dreadful state of agony, and died shortly afterwards. The jury returned a verdict of "Accidental death."

TO CORRESPONDENTS.

Wanted, January, February, and June numbers of this Journal, 1865. Full price given. Apply to Elias Bremridge, 17, Bloomsbury Square.

E. J. K. (Worcester).—The labels referred to would render the pills liable to the stamp duty, as a secret nostrum, however small the quantity sold.

S. S. S.—We are unable to give the information. Apply at the Emigration Board, 8, Park Street, Westminster, S.W.

L. A. (Cork).—(1) We are unacquainted with the term. (2) The formula for making Blue Pill according to Mr. Stoddart's method will be found in this Journal, vol. xv. p. 322.

K. W. (Edinburgh) and *J. K.* (Dunse) wish for a formula for "Lime Cream" for the hair.

W. Y. K.—The subject will be considered.

W. D. (Woodbridge).—"Prepared Natron"—*Subcarbonate of Soda.*

G. L. N. (Exeter).—The lozenges in question are liable to the stamp duty, whether advertised or otherwise.

C. J. (Birkenhead) wishes to state, as a caution to others, that he gave to a terrier dog 15 minims of *Ext. Filicis Liquidum*, and in five minutes afterwards the dog was dead, although strong and hearty before, excepting that he was troubled with worms.

W. (Halifax).—Your note has been forwarded to the Secretary of the British Pharmaceutical Conference, who has doubtless before this communicated with you.

J. H. (Nottingham).—Fownes's 'Manual of Chemistry' and 'Bentley's 'Manual of Botany.' For further information apply to the Secretary of the Pharmaceutical Society, giving name and address.

Apprentice (Brighton).—We regret that we cannot recommend the book mentioned. It contains numerous errors.

C. P. (Rusholme).—"Coating Pills." See Vol. III. (2nd series) p. 562.

ERRATA.—Page 411, *for* "Ol. Amygd. ʒix," *read* "Ol. Amygd. ℥ix." Page 440, *for* "Hypophosphatis," *read* "Hypophosphitis."

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, Bloomsbury Square.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VII.—No. X.—APRIL, 1866.

THE PENALTY FOR A MISTAKE.

The recent trial at Lewes, of which a report will be found at page 527, cannot fail to excite many serious reflections in the minds of those who are engaged in the practice of pharmacy. Is there any one of them who can ensure to himself exemption from accident? Happily such accidents as that which formed the subject of this investigation are of rare occurrence, but they sometimes happen, as in this instance, to qualified, experienced, and careful dispensers, who have the knowledge and skill acquired by many years of study and practice in their profession, and who employ the most approved means of guarding against such mistakes. No precautions that can be adopted will entirely preclude the occurrence of accidents, and if those who commit them are to be held responsible in proportion to the amount of damage resulting, and not to any defect of qualification or precaution to which the accident can be ascribed, the position of the pharmaceutist becomes a serious one indeed.

It must have been highly gratifying to Mr. Noakes, and it will be so to all his brethren, to find that one of the most eminent of our judges, the Chief Justice of the Court of Common Pleas, practically condemned the prosecution of this case, as one that ought not to have been undertaken. When a Judge in his charge to the Grand Jury says, "I commend the case to your careful notice, because, as I read the depositions, I think that the charge is not made out against the accused," we do not expect to hear anything more of it, and such appears to have been the expectation formed by the public in this case, for we find it stated in the newspaper report, that "at about half-past four in the afternoon, and *to the great astonishment of every one in Court*, the Grand Jury, notwithstanding the way in which they had been charged by the learned Judge, brought in a true bill against Richard Noakes for feloniously and wilfully causing to be taken by Samuel Boys, a certain deadly poison called aconite, and thereby slaying the said Samuel Boys, on the 21st of August, 1865." This act of the Grand Jury caused even more surprise than the fact of Mr. Noakes having been committed by the magistrates to take his trial, or of the charge having been preferred against him at all. From the first, it was known that the friends of the deceased were not the prosecutors, and even the Judge significantly pointed to the fact, that it was not at all by the desire of the widow that the proceedings were taken. Where, then, has the prosecution originated? There has been no expression of public feeling in favour of such a course, nor have the medical profession in any way favoured it. In fact, there appears to have been a mystery about the prosecution altogether. The magistrates committed, and the Grand Jury, composed of magistrates, confirmed the committal by finding a true bill, yet it has been clearly shown that there was not sufficient ground for such a prosecution, not only by the immediate acquittal of the accused by the jury before whom the case was tried, but also, and especially, by the Judge's charge to the Grand Jury, and by his having practically stopped the trial before any defence was offered. We feel assured that Mr. Noakes will have the sympathy of his brethren throughout the whole country, on account of the pain and anxiety he must have suffered in connection with this sad case. It will be some satisfaction to him, and some atonement for the unnecessary infliction to which he has been subjected, that he has received an honourable acquittal by judge and jury, and we hope and confidently expect that he will continue to enjoy the confidence of the medical men and public of Brighton by whom he has been so long patronized.

PHARMACEUTICAL ASSISTANTS AND APPRENTICES.

We have inserted communications this month from "A Member by Examination," and "A Registered Apprentice," which give rather a discouraging view of the condition and prospects of the rising generation of Chemists and Druggists. The object of the writers has obviously been to promote the advancement of the qualification and social position of the members of the trade to which they belong, and we would aid them in the furtherance of this object, but think the descriptions given of the existing condition of Chemists' Assistants and Apprentices is too sweeping and depreciatory. That there is room for improvement in all the particulars referred to, we have no doubt, but neither can it be doubted that much has been done towards raising the status of those now entering the business. Not only are apprentices drawn from a better class than formerly, but there is much more encouragement afforded them for the acquirement of scientific knowledge, and the number of those who avail themselves of the advantages offered is, we believe, steadily increasing. The list of registered Apprentices of the Society, as well as of those who pass both Minor and Major examination, is yearly increasing, and, at the same time, there is an increase in the proportion of candidates who successfully prepare for the examinations without availing themselves of the means of instruction provided in Bloomsbury Square. This is good evidence of a growing improvement from which we may take encouragement. At no time since the formation of the Pharmaceutical Society have the prospects of the cause in which it labours been brighter than they are at present, and although much yet remains to be done, and pictures may be drawn representing the uncultivated state of the land in places, there are ample grounds for congratulation with reference to the past, and for hope with reference to the future.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *7th March*, 1866,

Present—Messrs. Bird, J. B. Edwards, Evans, Hanbury, Haselden, Hills, Mackay, Morson, Randall, Sandford, Savage, Squire, and Waugh,

The following were elected

MEMBERS.

Bailey, John Bassatt	Whitchurch.
Bulmer, Thomas Fitzgerald	Preston.
Cruse, Thomas Harris	Southsea.
Dyson, Walter	Manchester
Hall, Thomas Howard	London.
Holmes, Edward Morell	Plymouth.
Lenton, Wm. Henry	East Dereham.
M'Innes, Andrew	Ardrossan.
Neve, Francis Charles	Ore, Hastings.
Orton, Thomas Johnson	Leamington.
Reece, John	Birkenhead.
Rose, Alfred	Lower Norwood.
Strachan, John	Allahabad.

EXAMINATION, *14th March.*

(Registered as Pharmaceutical Chemists.)

Barrowclough, Alfred	Mirfield.
Beckett, William	Heywood.
Keevill, Robert	Clifton.
Owles, James John	Yarmouth.
Phillipps, William	London.
Robinson, Joseph Spencer	Alfreton.
Stoneham, Philip	London.
Weston, Samuel John	Leicester.

EXAMINATION, *21st March.*

MAJOR (Registered as Pharmaceutical Chemists).

Baker, Parson Custance	Holt.
Day, John	Retford.

MINOR (Registered as Assistants).

Fox, William Albert	St. Albans.
Peck, Frederick Hamilton	Poole.
Speechly, Edward	Bishop Stortford.

REGISTERED APPRENTICES AND STUDENTS.

Name.	Residing with	Address.
Beard, Thomas William	Mr. Hyslop	London.
Clark, Henry Edward	Mr. Jones	Liverpool.
Cross, Wm. George	Mr. Churchouse	Chard.
Curry, George John Symons	Mr. Bennett	Helston.
Fryer, Charles	Mr. Martin	Guildford.
Griffin, Thomas	Mr. Baxter	Bromley, Kent.
Harries, Howell	Mr. Davies	Carmarthen.

Horton, Walter Charles ......Mr. Russell..............................Windsor.
Iliffe, George.........................Mr. Iliffe ....Nuneaton.
Lacey, Thomas Warner ......Mr. Merryweather......................Leicester.
Martin, Nicholas Henry ......Mr. Solomon ....Penryn.
Metcalfe, Edmund Henry ...Mr. Thompson ....Richmond, Yorkshire.
Owles, Eustace William ......Mr. Hingston...........................Liverpool.
Palk, William ....Mr. Palk...................................Southampton.
Potter, Herbert....................Mr. Burton................................Sutton.
Smith, John ....Messrs. Argles, Son, and Stonham...Maidstone.

BENEVOLENT FUND.

SUBSCRIPTIONS RECEIVED DURING MARCH :—

London.

	£	s.	d.
Allchin, A., Barnsbury.........	0	10	6
Balch, Edwin, Brixton.........	0	5	0
Barnes, J. B., Knightsbridge...	0	10	6
Bromley, R. M., Denmark Hill	0	10	6
Brooks, C., Wandsworth Rd.	0	10	6
Chubb, J. C., 59, St. John St.	1	1	0
Coles, J., Camberwell New Rd.	0	10	6
Cooke, J., Hoxton Old Town	0	5	0
Davies, W., Gray's Inn Road	0	5	0
Deane, Henry, Clapham	1	1	0
Faulconer, R. S., Walworth Rd.	1	1	0
Fincham, R., 57, Baker Street	2	2	0
Foott, R. R., Lower Eaton St.	0	10	6
Fox, William, Bethnal Green	1	1	0
Gadd, Charles, Vauxhall	0	5	0
Goodwin, John, Lower Clapton	1	1	0
Griffiths, J., Clerkenwell Green	0	10	6
Howell, Maurice, Peckham ...	0	10	6
Huskisson, W., Swinton Street	0	10	6
Huskisson, W., Jun., Swinton St.	1	1	0
Huxtable, J., St. John St. Rd.	1	1	0
Jefferson, Thomas, Clapham...	0	10	6
Jones, Wm., Kensington	0	5	0
Kendall, C. F., Clapham Rd. .	0	10	6
Kent, T., Blackfriars Road ...	0	10	6
Kershaw, G., 113, Park St. ...	0	10	6
Large, J. H., New North Rd.	0	10	6
Mitchell, J., Islington	0	10	6
Nicholson, F., Highbury	1	1	0
Penrose, A. W., 7, Amwell St.	0	10	6
Porter, Wm. H., Brixton......	0	10	6
Roberts, A. J., Walworth Rd.	0	10	6
Rowe, R., 10, Abingdon Terrace	0	5	0
Slipper, J., 87, Leather Lane .	0	10	6
Smith, W. F., Walworth Rd.	0	10	6
Taylor, Thomas, Peckham ...	0	5	0
Treloar, T., 67, Ludgate Hill .	0	10	6
Tupholme, J. T., 38, Lamb's Conduit Street	0	10	6
Williams, J. J., Harrow Road.	0	10	6
Yarde, G., Lamb's Conduit St.	1	1	0

Country.

	£	s.	d.
Alfreton, Robinson, Josh. S. .	1	1	0
Ashby de la Zouch, Redfern, J.	1	1	0
Bath, Bright, William	0	2	6
,, Brooke, Charles	0	10	6
,, Commans, Robt. Dyer .	1	1	0
,, Davies, Jameson, and Barnett	1	1	0
,, Dutton, Charles H.......	0	10	6
,, Ekin, Charles	0	10	6
,, Fish, Joseph P.	0	5	0
,, Hancock, Edwin	0	10	6
,, Harding, Thos. T.	0	5	0
,, Keane, Edward	0	5	0
,, Kent, Fredk. Wm.......	0	10	6
,, Lear, William M.	0	10	6
,, Merriken, John B.	0	10	6
,, Nurthen, Fredk.	0	10	6
Bath, Parker, Matthew	0	10	6
,, Pooley, John C.	0	10	6
,, Potts, Francis E.	0	5	0
,, Rickwood, Henry	0	5	0
,, Rolfe, Wm. Adolphus .	0	5	0
,, Steel and Marsh	1	1	0
,, Tylee, John P.	1	1	0
,, Walker, Henry Jno. ...	0	10	6
,, Willison, Alfred	0	10	6
,, Williams, George	0	5	0
Beverley, Robinson, James M.	0	5	0
Birmingham, Foster, Alfred H.	0	10	6
,, Johnson, George ...	0	5	0
,, Musson, T. G.... ..	0	10	6
,, Palmer, Chas. F....	0	10	6
,, Pegg, Herbert	0	10	6
,, Snape, Edward ...	0	10	6

	£	s.	d.
Birmingham, Southall, Son, and Dymond	1	1	0
Brighton, Savage, W. D.	0	10	6
Bristol, Sircom, Richard	0	10	6
„ Stoddart, Wm. Walter	0	10	6
Coventry, Hinds, James	0	10	6
Croydon, Long, Henry	0	5	0
Darlington, Abbott, J. Thos.	0	5	0
Dudley, Hollier, Elliott	0	10	6
Durham, The Ven. Archdeacon Prest	1	1	0
„ Burdon, John	0	10	6
„ Coward, Edward	0	5	0
„ Morton, John	0	5	0
„ Peele, Henry A.	0	10	6
„ Prudhoe, Robert	0	10	6
„ Robson, George	0	10	6
„ Sarsfield, Wm.	0	10	6
„ Scawin and Wortley	0	10	6
Folkestone, Hammon, Richd.	0	5	0
Gravesend, Spencer, Charles	1	1	0
Goole, Squire, William	0	5	0
„ Hasselby, Thomas J.	0	5	0
Guildford, Martin, Edward W.	0	10	6
„ Saunders, Henry B.	0	5	0
„ Shepherd, George P.	1	1	0
Harleston, Muskett, James	0	5	0
Lancaster, Whimpray, Jno.	0	10	6
„ Wearing, Wm.	0	10	6
Leicester, Salisbury, Wm. B.	0	10	6
Leominster, Davis, D. Fredk.	1	1	0
Lewisham, Clift, Edward	1	1	0
Merthyr Tydfil, Thomas, Rees	0	5	0
Norwich, Arnold, Edward	0	5	0
Norwood, Rose, Alfred	0	10	6
Odiham, Hornsby, John H.	0	10	6
Oldham, Hargraves, Hy. L.	0	10	6
„ Henthorn, Joshua	0	10	6
„ Marlor, Jabez	0	5	0
Otley, Pratt, Richd. Munton	0	10	6
Plymouth, Hill, Simon	0	2	6
„ Sloggett, Thos. C.	0	2	6
„ Northcroft, J.	0	5	0
„ Burdwood, James	0	2	6
„ Gibbons, William	0	5	0
Richmond, Thompson, Thomas	0	10	6
Shildon, Veitch, William	0	10	6
Sowerby Bridge, Stott, Wm.	0	5	0
Tickhill, Crowther, Thomas	0	10	6
Whitchurch, Bailey, J. B.	0	5	0
Woolwich, Bishop, Thomas	0	10	6
„ Parkes, John C.	0	10	6
„ Rastrick, John A.	0	10	6

DONATIONS.

	£	s.	d.
Bournemouth, Blacklock, Henry	1	1	0
Durham, per Mr. Robson, Local Secretary :—			
Belough, Henry	1	1	0
Monks, Capt. 7th N. Durham Volunteers	0	5	0
The Mayor of Durham (Wm. Boyd, Esq.)	0	10	0
Plymouth, Loye, Philip	1	0	0
Ramsgate, Franks, Alfred	5	5	0
Yarmouth, Owles, Jas. John	0	10	6
Trilfield, George	1	0	0

BOTANICAL PRIZE FOR 1867.

A Silver Council Medal is offered for the best Herbarium, collected in any part of the United Kingdom, between the first day of May, 1866, and the first day of June, 1867; 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 Honour and 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 recent work on British Botany, 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, 1866, and the first day of June, 1867, and were named and arranged without any assistance but that derived from books." The age of the collector must be also stated in the note.

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, 1867, 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 Librarian, 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:—

Mr. Charles Wm. Bass,	Mr. Thomas Ramsey Kent,
" John Scoley Battle,	" Rowland Pritchard Jones,
" John H. Davis,	" Edward Skipper,
" J. T. Dumolo,	" R. J. Pye Smith,
" R. M. Evans,	" John James Thorn,
" Thomas Farries,	" Alfred Tingle,
" Alfred R. Hall,	" W. J. Walsham,
" Richard Hebron,	" Charles Cracknell Watts.
" William Jones,	" Robert Yates.

The above are arranged alphabetically, and without 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.

FINANCIAL STATEMENT.—*From January 1st to December 31st*, 1865.

Receipts.				£.	s.	d.
Balance in Treasurer's hands				815	0	10
Life Members' Fund:						
Fees	42	0	0			
Interest	74	0	6			
				116	0	6
Government Securities:						
Interest				62	10	6
Rent				83	10	0
Arrears of Subscription				71	8	0
Donations to the Society				2	2	0
Subscriptions:						
359 London Members	376	19	0			
1420 Country Members	1,491	0	0			
104 Associates	54	12	0			
161 Apprentices	84	10	6			
				2,007	1	6
Fees:						
50 Pharmaceutical Chemists	449	8	0			
67 Assistants	278	5	0			
103 Apprentices	216	6	0			
20 Registration Certificates	1	0	0			
				944	19	0
Fees:						
Lecture				173	15	6
Laboratory				457	18	0
Journals:						
Balance of Account				50	10	8
Sale of Steam Boiler				6	6	0
				£4,791	2	6

Expenditure.				£.	s.	d.
Life Members' Fund:						
Investment				42	0	0
Government Securities' Investment				1,000	0	0
Conversazione	59	10	$4\frac{1}{2}$			
Pharmaceutical Meetings	7	12	$9\frac{1}{2}$			
Repayments	6	6	0			
Sundries	6	1	5			
				79	10	7
House Expenses				40	11	3
Rent, Rates, Taxes, and Insurance				436	7	6
Repairs and Alterations				173	2	6
Fixtures and Fittings				47	16	3
Apparatus				11	19	2
Library				45	17	10
Museum (including two new Cases)				42	11	2
Furniture				5	17	6
Stationery				16	14	6
Postage				75	15	3
Printing and Engraving				80	19	7
Advertisements				9	6	0
Carriage				3	0	5
Collector's Commission				31	3	8
Travelling Expenses				127	16	5
Secretary and Registrar				300	0	0
Wages				177	16	2
Expenses of Society in Scotland				66	18	6
Board of Examiners				152	5	0
Professor of Chemistry and Pharmacy, etc.				300	0	0
Professor of Botany and Materia Medica, etc.				250	0	0
Subscription to Royal Botanic Gardens				21	0	0
Laboratory:						
Director's Salary and Percentage on Fees	300	16	0			
Demonstrator	100	0	0			
Porter's Wages	53	18	0			
Chemicals, Drugs, Gas, Coke, Coals, etc.	128	6	1			
				583	0	1
Parliamentary Expenses, viz. Stationery, Printing, Postage, Petitions, Reporters, Travelling Expenses, etc.				139	8	7
Repayment to Secretary				2	11	6
Balance in Treasurer's hands				527	13	1
				£4,791	2	6

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, 1865:—

On Account of the General Fund, New 3 per Cents	£2702	4	9
Life Members' Fund, 3 per Cent. Consols	2611	11	7
Benevolent Fund, 3 per Cent. Consols	6730	16	8
Bell Memorial Fund, 3 per Cent. Consols	2050	0	0

Frederick Barron,
William Edward Becket,
Robert Westwood,
Benjamin M. Tippett,
Auditors.

March 5th, 1866.

PHARMACEUTICAL MEETING.

Wednesday, March 7th, 1866.

MR. THOMAS HYDE HILLS, VICE-PRESIDENT, IN THE CHAIR.

The following papers were read:—

ON THE SEEDS OF *PHARBITIS NIL, Choisy.*

BY E. J. WARING, M.D., F.L.S.,

HER MAJESTY'S INDIAN MEDICAL SERVICE.

As some of the gentlemen present this evening may be aware, I have for several years, during a residence in India, directed much of my attention to the study of the medical plants and products of that country. In the course of my investigations, amidst much that is worthless and absurd, I have occasionally fallen in with drugs possessed of considerable activity, and worthy, in my opinion, of attention as therapeutic agents.

It has for a long period been a firm impression on my mind that some of these drugs might advantageously be introduced into practice, at any rate amongst medical men in the East,—some as efficient substitutes for European drugs, or rather of drugs imported from Europe; whilst others, the larger number, might be had recourse to in cases of need, when from any cause the imported articles were not available. The advantages which it appears to me would accrue to the practitioner in India from the utilization of indigenous remedies are threefold. 1. The cost of the drugs themselves would be comparatively small, as it will be easily understood how much the price of an imported article is increased by the expenses attendant on freight, commission, Custom House duties, and so forth. 2. The supply available would be more abundant and uniform; and 3. The drugs would for the most part be fresher and in better condition than articles can reasonably be expected to be after a long voyage to India, and then for months or more subjected to the deteriorating influence of tropical heat. It was a train of reasoning analogous to the above, added to other reasons which it would be out of place here to enter into, that led me, in the first instance, to propose the publication of a Pharmacopœia of India which, I am happy to say, is now making good progress.

It is to one of these indigenous Indian drugs I would this evening call the attention of the Society, viz. the seeds of *Pharbitis Nil*, Choisy, the *Convolvulus Nil* of Linnæus, the *Ipomœa cærulea* of Roxburgh, the *Hub-ul-neel* of Arabian writers.

Previous, however, to entering on the consideration of the properties and uses of this drug, I will offer a few general remarks on the Natural Order to which the plant yielding it belongs, viz. *Convolvulaceæ*, as such a procedure will serve to illustrate and strengthen the position I take with reference to the drug itself.

First, then, I would notice the fact that the prevailing or predominant characteristic of medicinal plants belonging to this Natural Order, is the possession of purgative properties, and all the drugs derived from it, as far as their medicinal properties have been ascertained with any degree of accuracy, are more or less purgative. De Candolle indeed has an *Ipomœa emetica*, a Mexican plant, which, from its specific name, may be supposed to be an emetic, but I can find no account of it in any books to which I have access. Scammony, the produce of *C. Scammonia*, Linn., and Jalap, the produce of *Exogonium purga*, Bentham, may be taken as types of the purgatives derived from this Order.

Almost every country, at least in the warmer portions of the globe, in which *Convolvulaceæ* are found most abundantly, has its peculiar purgatives derived from plants belonging to this Natural Order. Thus, North America has its *C. panduratus*, Linn., which has a place in the secondary list of the United States' Pharmacopœia; Mexico, the officinal Jalap plant; Brazil, *Ipomœa operculata*, Mart., the root of which, according to Guibourt, constitutes part of the *Mecohacan* of pharmacologists. In addition to this, Martius enumerates eight other Convolvulaceous plants of Brazil possessed of purgative properties; Jamaica has its *Ipomœa tuberosa*, Linn., which Barham (Hort. Amer. p. 177) considered, from the strongly purgative action of its juice, would yield scammony; Martinique, its *C. macrocarpus;* St. Domingo has its *Ipomœa cathartica;* Bourbon, its *Ipomœa Quamoclit;* Greece and the Levant, its *Convolvulus Scammonia*, the Scammony plant; and Europe its *C. sepium*, *C. arvensis,* and *C. Soldanella*, a full account of the purgative properties of which is furnished by Dr. Cazin in his erudite work on indigenous European plants; China and Cochin China has its *C. tomentosus*, for an account of which we are indebted to Loureiro.

It the above list it may be remarked there is no notice of India, yet from this country was derived the once-celebrated Turpith, or Turpeth Root, the produce of *Ipomœa Turpethum*, R. Br., often in old works designated *Vegetable Turpeth* in contradistinction to *Mineral Turpeth* (*the Yellow Sulphate of Mercury*). It is a remedy of extreme antiquity, being spoken of as the most excellent of all purgative roots in the great sacro-medical work of the Hindus, named 'Susruta.' The date of this work is uncertain, but Turpeth Root is described by Rhazes, who flourished in the ninth century; it was subsequently introduced into Europe, and after enjoying much repute as a safe and efficient purgative, it appeared as officinal for the last time in the French Codex of 1837. It may, without exaggeration, be affirmed that for a thousand years, this Turpeth Root held a respectable place amongst the ranks of purgatives. It, however, fell into disfavour, and its death-blow was dealt by Sir W. O. Shaughnessy, who, after trials with it in Calcutta, pronounced it, from the uncertainty of its action, unworthy of a place in the pharmacopœia. Some medical men, however, in India, hold a different opinion, and still regard it with favour. I have no personal experience with it myself, but I think it extremely probable that if it were desirable to increase the number of our purgatives, an efficient extract might be prepared from this root.

From what has been said,—and I fear that to some of you the previous remarks may have seemed rather tedious and extraneous,—you will perceive, gentlemen, that the individual drug, the *Pharbitis Nil*, which I now beg leave to introduce to your notice, comes of a good family of purgatives, is derived from a Natural Order which for ages has supplied some of our best and most renowned purgatives; whilst other members of the same family in different portions of the globe, have found favour in the eyes of the inhabitants as safe and efficient purgatives, though they have achieved no such successes as to entitle them to a place amongst officinal drugs.

Pharbitis Nil, Choisy (*Convolvulus cærulea* of Roxburgh) is a common plant in most parts of India, but is more abundant in Bengal and the northern districts than in the southern portions of the Madras peninsula; indeed, in Travancore, in which I spent the last ten years of my Indian life, it was rare; the only specimens that I am aware of existing there being from seeds obtained by myself, and raised in my own garden. Roxburgh furnishes us with the following description of it:—

"*Stems* and *branches* twining, annual, round, hairy, 6 to 12 feet long, as thick as a crow's quill; *leaves* stalked, broad, cordate, 3-lobed, downy, acute, 2 to 4 inches long; *peduncles* axillary, round, hairy, from 2- to 3-flowered;

bracts and *sepals* linear; *flowers* large, of a beautiful light but bright blue; *stigma* subglobose, large, glandular, 3-lobed; *capsule* much shorter than the calyx, smooth, 3-celled, with two seeds in each cell."

Before proceeding further, it may be advisable to say a word on what, to many of you, may seem its curious specific name—*Nil*. This is a Hindústani name, and simply signifies *blue*, and is applied to this plant, on account of its large, beautiful blue flowers. This word has, in a measure, become Anglicized, as in the word Nilgherries, which simply signifies blue mountains. The Hindústani name of Indigo is *Nil*, or *the* blue dye, and when gentlemen are speaking of *Aniline*, they are unconsciously employing a word of purely Hindústani origin.

The seeds (*Semina Pharbitis Nil*) are commonly met with in the bazaars of Bengal, and Northern and Central India, under the Hindústani name of *Kala dana*, which signifies literally black seed (*Kala* black, *dana* seed), and their average cost in Calcutta, according to a return published by Sub-Assistant Surgeon Kenny Loll Dey, is about 6*d.* per pound. They are comparatively rarely met with in the Madras bazaars, hence it happens that they find no place in Ainslie's Materia Indica, the researches of that gentleman having all been conducted in the southern portions of the Peninsula.

The seeds, as their name indicates, are of a black colour, angular, about four lines or more in length, weighing on an average about half a grain each, having the form of a segment of an orange. On being chewed they are sweetish; but they subsequently leave rather an acrid taste in the mouth; they have, especially when fresh, a slight, peculiar, heavy smell, but these sensible qualities become diminished or are lost by long keeping.

No satisfactory analysis of them has been made, but according to O'Shaughnessy they contain a resin, gum, starch, a bland fixed oil, fibre, and colouring matter.

Though the purgative nature of these seeds appears to have been long known to the natives of those portions of India in which the plant is indigenous, their properties, in modern times, were first noticed in 1824, by Roxburgh (Flor. Ind. 1st ed. vol. ii. p. 91), who states that he has heard them much praised as an effectual quickly-operating, safe cathartic. The first clinical trials made with them were by Sir W. O'Shaughnessy, about 1840 (Bengal Disp. p. 505), in the Police Hospital, Calcutta, when he found that in doses from 30 to 40 grains, they acted in the manner represented by Roxburgh. In a hundred cases in which they were administered, they proved purgative in ninety-four, occasioned vomiting in five, and griping in fifteen. They produced, on an average, five stools within two hours and half, their operation generally commencing in about one hour and ceasing within four hours. In addition to his own experience, he cites that of Drs. Chapman, Green, Martin, Goodeve, Leckie, and Stewart, to the same effect. He reported equally favourably of an alcoholic extract prepared from them, in 10-grain doses.

The next, and even more conclusive testimony I would mention is that of Dr. Kirkpatrick, Madras Medical Service. In his Catalogue of Mysore Drugs (No. 467), he states that after employing these seeds in between five and six hundred cases, he has come to the conclusion that they form a very valuable, safe, and certain purgative, intermediate in strength between rhubarb and jalap. He advises that the seeds should be boiled in water for three minutes, then dried and reduced to a fine powder, and thus prepared to be administered in doses of a drachm. He further advises that the powder should be conjoined with a little ginger or omum-water (distilled water of *Ptychotis Ajowan*), and given in conjunction with cream of tartar, like Pulv. Jalapæ Comp. He is of opinion that it is not so apt to nauseate as Jalap, and that, though not quite so active, it is no less certain in its operation. In an official report from Dr.

H. R. Oswald, dated August 24th, 1865, it is stated that these seeds are in daily use in the Mysore hospitals as a substitute for jalap.

The only other testimony with which I will trouble you, and that very briefly, is that of Dr. George Bidie, the present Professor of Materia Medica at the Madras Medical College. After extensive trials with it, he states that he has always found the powdered seeds a very safe and efficient purgative, in its action very analogous to that of jalap. The great objection he sees to its employment is the largeness of the dose (ʒi), and he proposes to substitute a resin which he calls "*Pharbitisin*," which, in doses varying from five to eight grains, he has found to act safely and efficiently as a purgative. He gives the process by which he obtained this, but it appears to me that it may more easily be prepared by the process advised for the preparation of the Resin of Jalap.

My own experience with this drug has been limited, my supply of seeds being only that obtained from plants grown in my own garden; but I saw sufficient to confirm, in my own mind, the statements of O'Shaughnessy, Kirkpatrick, and Bidie which I have just detailed to you.

It is but right that I should mention, that in a communication recently received from Dr. W. Dymock, of Bombay, he states that he witnessed *one seed*, taken by an adult female, produce excessive purgation. This is the only instance I have heard of, in which any ill effects have followed the employment of these seeds, and I think that I am fully justified in regarding it as an exceptional case.

These, gentlemen, are all the remarks I have at present to make with regard to this drug, which I cannot but regard as a valuable purgative. Our 'British Pharmacopœia' has a sufficient number of purgatives in it already, and there can be no object in increasing this number, but I venture to hope that you will agree with me in thinking that in India, where this drug is indigenous, where a supply is always available at an almost nominal cost, which would render the practioner in the East in a great measure independent of an imported article of the same class, it would be unwise not to award to it a high place in our consideration.

Mr. Hanbury said that the establishment of the value of such a purgative as had been brought before them that evening by Dr. Waring was especially important, from the fact that the *Pharbitis Nil* could be grown readily in all tropical countries. He understood that recently a resin similar to jalap resin had been extracted from these seeds.

Professor Bentley said that the evidence in favour of the value of the seeds of the *Pharbitis Nil*, as a purgative, was so strong, and had been referred to by so many good pharmacologists and physicians, that he thought that there could be now no doubt upon this point. So far as he could judge, from the evidence submitted to him, it would appear that these seeds owed their purgative properties to a resin resembling that of jalap resin, and that their action was similar to that of jalap, but the dose required to produce the same effect would be about double that of jalap. It was quite true that many good purgatives were now in use in this country, but as jalap was getting scarce, and consequently of high price, the seeds, the action of which had been now so fully proved by Dr. Waring, might prove an economical substitute, if required, for that drug.

ON A RECENTLY PROPOSED TEST FOR ADULTERATION IN OTTO OF ROSES.

Professor Redwood communicated the results of some experiments he had made to ascertain the value of a test recently proposed by Hager, and published in the 'Pharmaceutical Journal' (February, 1866, page 424 of the present volume), for detecting the adulteration of otto of roses. This test was based upon the alleged fact, that strong sulphuric acid forms, with pure otto of roses, a resinous substance, which is entirely soluble in absolute alcohol, while the ordinary adulterants of otto form products that are insoluble, or but partially soluble. The great difficulty, he said, that was generally experienced in inquiries such as this, was to get specimens for comparison that could be relied upon as genuine; but in the present instance he had been relieved from that difficulty by having a number of samples of genuine otto of roses and of oils used for its adulteration placed at his disposal by Mr. Daniel Hanbury. These samples were described by Mr. Hanbury in a paper published in the 'Pharmaceutical Journal,' vol. xviii. p. 504, in which an account is given of otto of roses, its production, adulterations, and usual commercial condition. It was generally admitted that commercial otto of roses was rarely if ever unadulterated, and some test by which the nature and extent of its adulteration could be determined was much wanted. Hager's test was represented as supplying the required want, but he (Dr. R.) had not found it to be a reliable test. In the experiments he had made, he used four samples of what were considered to be genuine otto, one sample of the ordinary commercial otto of English commerce, two samples of oil described by Mr. Hanbury under the respective names of *Roshé oil* and *Idris Yaghi*, said to be obtained from a species of *Andropogon*, and extensively used in the adulteration of otto, a sample of oil of geranium, and a sample of spermaceti. Of the four samples of genuine otto, one was of English manufacture, having been produced by Mr. Whipple in the distillation of rose-water, two were of French manufacture, and one was Turkish. These had all been obtained by Mr. Hanbury under circumstances which appeared to afford a sufficient guarantee of their genuineness. The samples were all submitted to the action of Hager's test, as described in the published account of it, five drops of the oil being mixed with twenty drops of oil of vitriol, and the thick brown product resulting from the action of the acid on the oil being afterwards added to three drachms of absolute alcohol, and heated to the boiling-point. According to Hager's statement, genuine otto, when thus treated, ought to yield a yellowish-brown solution which should remain clear after having been heated and allowed to cool, while from the solution made with adulterated otto, a separation takes place, either of a dark fluid, which collects at the bottom of the alcoholic solution, or of a flocculent substance that either rises to the surface or remains suspended in the liquid. The latter result is represented as indicating the presence of spermaceti, while the former indicates the presence of one of the oils used as an adulterant.

The results which he (Dr. R.) had obtained did not entirely accord with this representation. The two oils called *Roshé Oil* and *Idris Yaghi*, which Mr. Hanbury describes as identical, gave results such as Hager ascribes to the oils of geranium, palm-rose, and pelargonium,—a dark resinous substance separating from the alcohol, and collecting in a globule at the bottom. The sample of genuine geranium oil, however, gave no such result, but formed a clear brown solution, similar to that obtained with genuine Turkey otto. Spermaceti gave a result similar to that ascribed to it by Hager. Therefore, so far, two of the adulterants appeared to answer to the test, and one did not. On the other hand, applying the test to the four samples of genuine otto, it was found that with two of them, namely, the English and one of the French samples, a flocculent matter separated from the solution, which closely resembled that produced with spermaceti, so that only two of the samples, one French and the other Turkish, answered to the test as genuine otto. Moreover, it was found that the sample of commercial otto, which there was every reason to believe was not genuine, gave the indications of genuine otto. Under these circumstances, he did not think that any reliance could be placed on this test, and as a bad test was worse than none at all, it was desirable that pharmaceutists should be cautioned against judging of the genuine or spurious character of a costly drug such as otto of roses by such imperfect means. He had frequently had occasion to investigate means that were suggested for testing essential oils, and had generally found them to be imperfect and unsatisfactory. There was often considerable difficulty in judging of the genuineness of an essential oil, in consequence of differences occurring in genuine samples of the same oil. These differences arose partly from the influence of soil and climate upon the plants yielding the oils, partly from the process adopted in their separation from the plant, and partly from changes which occurred in keeping them. Thus English otto of roses contained a large proportion of a solid fatty matter, which gave it a high melting-point, and caused the peculiar reaction, in the application of Hager's test, resembling that caused by spermaceti. Some samples of French otto also contained a good deal of this solid fat, while Turkish otto contained but little of it. It could hardly be expected that different samples of an oil thus differing in composition should give the same reaction with a test. There were many other oils in which similar differences were observed. Essential oil of almonds differed materially in its characters, properties, and composition, according to the process by which it was produced. Oil of cloves, again, differed at different stages of the process of distillation. Then most essential oils underwent changes when they were long kept, especially if exposed to the air. Differences thus caused not only affected the chemical reactions of the oils, but also their physical characters, so that no great reliance could be placed on specific gravity, refractive power, or the power of rotating a ray of polarized light, for all these characters were liable to change under the influences alluded to. Thus, for instance, it was well known that French and English oil of turpentine rotated the plane of polarization of a ray of light in opposite directions.

Mr. D. Hanbury explained the circumstances under which he had obtained the samples of otto of roses and of oils used for its adulteration, which he had supplied to Dr. Redwood for the experiments which had been described. He thought the samples of otto might be relied upon as genuine, for he received them directly from the manufacturers as genuine samples. He believed the oils labelled *Idris Yaghi* and *Roshé Oil* were identical, and their similar reactions with Hager's test tended to confirm this.

Dr. Attfield remarked that, in confirmation of what had been stated by Dr. Redwood, he might mention the fact that some time ago he received two samples of oil of cloves from Mr. Whipple, both of which were obtained in the same operation, and he found one to be a pure hydrocarbon, while the other consisted of eugenic acid—a body containing oxygen.

Dr. Edwards, of Liverpool, suggested that probably spectrum analysis might be applied to aid in detecting intrinsic differences in essential oils.

Mr. Mee inquired if Dr. Redwood had made any experiments to ascertain whether the cohesion figures described by Mr. Tomlinson might be used as means of testing the oils alluded to.

Dr. Redwood replied that he had not done so, and he thought such a method of testing, which depended on the physical condition of the oil, could not be of much use, as these and other essential oils are subject to constant variation in their physical conditions.

Dr. Waring stated that oil of sandal-wood was used in India to adulterate otto of roses.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

The Seventh General Meeting was held in the Royal Institution, on the evening of January 18th; the President, A. Redford, Esq., in the chair. Messrs. F. Bryan, A. Williams, and H. Mossop were elected members. The President described a ready method of preparing *Pil. Ferri Iodidi*, that might be practised by members in case of emergency. Mr. Wright instanced a ready means by which he was enabled to obtain clear Liq. potassæ. Dr. Edwards mentioned that he was present at the Council Board of the Pharmaceutical Society when the resolutions adopted at a former meeting of the Association were brought forward for consideration, and that he felt at liberty to say that the Council had every disposition to advance the views of the Association on all possible occasions, but in the case referred to the Council considered that it was inadvisable to take action in the matter. The President expressed the thanks of the Association to the Council of the Pharmaceutical Society for the courtesy and goodwill shown on the occasion.

The President then introduced Professor Archer, F.R.S.E., who read the paper of the evening "On the Sources and Uses of Starch." The author dwelt more upon the many plants of tropical growth which secreted starch in such quantities as would prove profitable of extraction, and the nature and properties of such starches. In the course of the paper he reflected upon the supineness of Englishmen in embarking upon new enterprises of a commercial and manufacturing nature, unless the paths had been well marked out and leading to successful results. In this respect he considered we were a good way behind our French neighbours, whose activity in obtaining useful products from many sources of which Englishmen took little note might be emulated with much advantage to many branches of British industry. At the conclusion of the paper a vote of thanks was proposed from the chair, to be passed to the Professor for his instructive paper. This was accorded by acclamation, and the meeting concluded.

The Eighth General Meeting was held on the evening of February 1st; the Vice-President, Nathan Mercer, Esq., occupying the chair.

Dr. Edwards said that he was commissioned to offer a few descriptive remarks on the small French magnetic apparatus exhibited by the Vice-President. In the course of his remarks he passed a high eulogium on the constructive and adaptative talent of the French, who frequently placed before the public, and within the limits of what might be termed a "toy," apparatus which others regarded in the light of ponderous and complicated arrangements. This was especially the case with the instrument on the table; for while to all outward appearance there was little indicative of the arrangements of the large electric batteries employed in many researches, yet its power was such as to give all the phenomena of electric discharges of the larger batteries in a remarkable degree. He declared his inability to conceive how electricity of the tension required was produced in the little pocket instrument under consideration, but that it was produced was beyond question. He then proceeded to exhibit the varied effects by passing the spark through various rarified media, showing the stratification of the light, etc. etc., as usually seen when the large battery and coil were employed. The Chairman thanked Dr. Edwards for his remarks and illustrations, and then called upon Mr. Thos. Williams to read the paper of the evening "On Maceration and Percolation in the Preparation of Medicinal Tinctures and Extracts." Mr. Williams entered at once into the consideration of the practical requisites and conditions for effecting the exhaustion of medicinal matters of their valuable principles, also of the best forms of apparatus suited for percolation. With respect to the term "displacement," as applied to the exhaustion of certain bodies, he considered it a misnomer, as, instead of displacement, only a degree of dilution was effected in the adapted forms of vessels for this purpose. Maceration and certain forms of macerating vessels, including Redwood's automatic macerator, were described, as also a modification of the latter apparatus, which the author found to give good results. In the body of the paper the author dwelt upon other matters of practical difficulty, and suggested improvements which in many instances he found answered well. After the reading of the paper, the Chairman desired that members should direct their attention to points of practical interest, as suggested in Mr. Williams's paper.

Mr. Barber exhibited two forms of Fleming's Patent Coffee-pot, which he had constructed for purposes of maceration, etc.

Mr. Abraham considered that Mr. Williams had treated his subject very philosophically, and that much credit was due to him on that account. He thought the directions of the Br. Ph. so good that very little could be desired in addition; he found those directions to answer well in every case, with the exception of the *fluid extract of bark*, for the time required to exhaust the bark was such that the solution became mouldy.

After some further remarks from the Chairman and others, a vote of thanks was passed to Mr. Williams for his able paper.

The Ninth General Meeting was held on the evening, February 15th; the President in the chair. Donations of the 'Pharmaceutical Journal,' 'The Chemist and Druggist,' and of the 'Proceedings of the Liverpool Polytechnic Society' were announced, and thanks offered to the donors.

The President laid a specimen of iodide of iron pill-mass on the table; it had been prepared according to the method which he described at a former meeting, and seemed to retain its properties remarkably well. He likewise exhibited a sample of "syrup of phosphates," on which a considerable crystalline deposit had formed. Mr. Williams thought it possible that the monobasic phosphoric acid was contained in the preparation, as he found syrups in which this form of phosphoric acid was contained did undergo decomposition on being kept for some time. The paper of the evening was by the President, "On the Pancreas and 'Pancreatine' in relation to the digestive process." After detailing, with the aid of diagrams, the position of the pancreas in the viscera, he entered upon a description of its functions in digestion, and recounted the various investigations of which it formed the subject. The author next passed to the consideration of "pancreatine," which seemed to be gaining ground as a remedial agent, and concluded his paper by reading the published results of Dr. Dobell's treatment of pulmonary affections by means of pancreatine.

A spirited discussion of the subject was maintained by Messrs. Williams, Davies, M'Kinlay, and others, after which Mr. M'Kinlay moved that a vote of thanks be offered to the President for his interesting paper. Carried unanimously.

The Tenth General Meeting was held on the evening, March 1st; the President in the chair. There was a large attendance. The following were duly elected members, Messrs. Sharp and Houghton. Donations of the 'Pharmaceutical Journal' and of 'The Chemist and Druggist' were announced, and the thanks of the meeting voted to the donors. The President called upon Mr. H. Sugden Evans, F.C.S., etc. to read the paper of the evening, "On the Use of the Prism in Chemical, Micro-Chemical, and Physiological Investigations." Mr. Evans said, that the subject of the action of the prism on light was not new to the members of the Association; but he hoped that while he should necessarily have to recount much of what the audience already knew, he would be able to enlarge the subject, so that some further knowledge might be acquired from what he should lay before the meeting. The author then passed in review the labours of Newton in relation to the analysis of light, and likewise those of Fraunhöfer, Daniel, Brewster, Miller, and other investigators, in determining the dark lines of the spectrum, and their position. The wave theory of light was described and illustrated, during which the author passed to the critical examination of the nature of the change in white light, as effected by the prism. Spectrum analysis was next considered, the author giving the merit of the conception of this modern mode of investigating matter to Talbot, whose published views on the subject were read by him. The labours of Schwann, Kirchoff, and Bunsen were alluded to, after which the author entered upon a critical examination of the respective modifications produced in the prismatic bands of white light after it had traversed different bodies held in solution, and from which he deduced that if prosecuted with zeal this field offered a promise of a rich harvest to the chemist and physiologist, particularly referring to the application of the prism to the microscope in physiological investigations. Mr. Evans said he had thus examined the blood globules of various animals, and found that in each, certain well-defined absorption bands occurred, but their relative width and position in the spectrum varied to a very appreciable degree; whether this was a constant result that could be relied upon for jurisprudencial purposes, or merely the result of digestive inequalities, his experiments had not been sufficiently numerous to determine; it was nevertheless an interesting fact to note. The paper was profusely illustrated by diagrams and spectra of the various bodies alluded to in the paper, thrown on the screen with very fine effect by means of Mr. Highley's pneumatic electric lamp.

The President, in the name of the meeting, thanked Mr. Evans for his very able paper, and the manner in which he brought the abstruse subject so plainly before their intelligence; he expressed the pleasure he had in moving a vote of thanks to Mr. Evans. Carried by acclamation.

BATH CHEMISTS' ASSOCIATION.

The usual monthly meeting of the above Association was held at the Commercial Room on Friday evening, the 2nd of March. A large number of members and their assistants attended. Mr. Commans, President, in the chair. Mr. Schacht, of Clifton, read the following paper on his method of filtration. A discussion ensued, in which several members took part.

Mr. Tylee proposed, and Mr. Pooley seconded a cordial vote of thanks to Mr. Schacht for his valuable paper, and for his kindness in coming to Bath.

"On certain Physical Aids to Filtration," by G. F. Schacht. The lecturer, after alluding in high terms of admiration to Dr. Attfield's lecture upon the "Physics of Filtration," and to several thoughtful communications he had privately received from that gentleman, begged his audience to follow him while he briefly referred to some of the general properties of matter, and its behaviour when under the influence of those forces which he thought were concerned in the process of filtration. He then hastily treated upon the subjects—Gravitation, Cohesion, Adhesion, Elasticity, Statics, and Dynamics.

The explanations upon these points were necessarily abrupt, but beside their general bearings upon the matter, attention was especially drawn to the different behaviour of masses of matter under the influence of these forces when in the solid form, and when in the form of liquids and gases, chiefly in the respect of the pressure resulting from their gravity operating in the former case in masses, and consequently downwards only, that is towards the earth's mass, and in the latter case—particle by particle; and hence, the particles being infinitely mobile, not only downwards, but laterally and upwards also. He showed this fact to be at the root of hydrostatic and aerostatic phenomena, and in illustration, referred to the enormous accumulation of statical force that was obtainable within a confined space by the application from without, to a small area of that space of a comparatively small amount of force. He stated this impulse, whatever its amount, to be felt by every portion of the confined space of the same area as that originally influenced, and, in illustration, asserted that if a cubical box, measuring twelve inches every way, were filled with water, and into one square inch of its wall a tube were inserted through which might be applied some force equal to one pound weight; that weight would be felt by every square inch column within the box, and would result in a pressure upon its inner walls equal to one pound multiplied by the number of square inches contained upon those walls, viz. 864,—that is, 6 sides of 144 square inches each. He added, the same phenomena would occur were the box filled with air, provided the same conditions of pressure were brought about, and he begged his audience to get this fact clearly before them—that the amount of pressure upon the inner walls of a vessel, communicating with the outside by means of an aperture, would always be equal to the pressure upon that aperture (be it great or small) multiplied by the number of times the area of the inner walls exceeded the area of the aperture. For example, in the case of a vessel of air, if the pressure upon the aperture be increased beyond the ordinary pressure of the atmosphere, the strain upon the containing walls might be so great as to risk disruption *from within;* and, on the other hand, if a portion of the ordinary pressure of the air be withdrawn from the aperture, the walls might be driven inwards by the inadequately-opposed pressure of the air *from without.*

He then drew attention to some of the dynamical results of the employment of statical force. Torricelli had long ago announced a law which bore upon the relation of the rate of efflux of liquids to the height of the column of liquid above the aperture from which it is flowing. The *statical pressure* upon any spot in the containing vessel, it would be readily understood to be in *direct* proportion to the height of the columns of liquid above it; that is, if at one foot the pressure equalled one pound, at two feet it would equal two pounds, at three feet three pounds, and at four feet four pounds. But convert that spot into an aperture, and allow the liquid to flow, and Torricelli had shown the rate of flow would not increase in the same *direct* proportion to the height of the column, but in a proportion which coincided with the *square root* of the height of the column. If, therefore, the flow at one foot equalled one pint, the rate would not be two pints, until the height of the column had increased to four feet, nor to three pints until the column were nine feet high; the square roots of four and nine being respectively two and three. This was Torricelli's law enunciated, the lecturer believed, simply in connection with the relation which the rate of flow bore to the height of the column, but Dr. Attfield was at the present moment at work upon the subject, and his observations had led him to include Torricelli's law in one of larger scope, which might possibly be expressed somewhat thus, "The efflux of fluids from apertures is in proportion to *the square roots of the powers operating*."

Dr. Attfield had not yet publicly announced his views, but the lecturer stated he had the Doctor's permission to allude to them as he had done. He added, they appeared to him to be theoretically so sound, he had little doubt of their being proved true.

He then continued:—Having now refreshed your memories, Gentlemen, upon these general matters, and indicated a few points which I wish to be especially borne in mind, I turn to the immediate subject of my lecture, "Certain Physical Aids to Filtration."

If the process of filtration were really analogous, as some have appeared to think, to the separation of fish from the water in which they swim by means of a net, it would present so few difficulties that we should never need to think about aiding it in any way. But I deem the word filtration to mean something essentially different from "straining," so essential as to involve fresh elements of force. For instance, that form of attraction which we have just been considering, called adhesion, does not, in the smallest degree, influence the process of catching fish in a net; but should any one doubt its influence in filtration, let him try the difference between the effort to pass an ounce of *mercury* through a filter of blotting-paper and an ounce of water. In the former case there being no adhesive attraction between the liquid and the filtering medium, no transmission of the liquid takes place, whilst in the other case the adhesive attraction, as we have seen, is considerable; sufficient, indeed, to overcome that of gravitation, and hence the transmission of the liquid is comparatively easy. There appears, then, to be a fundamental difference between filtration and straining; but, be that as it may, we all know straining to be a light and easy matter, whilst, under the most favourable circumstances, filtration is heavy and slow. The cohesive force which holds the particles of the liquid together has to be overcome; the particles have to be separated very minutely, so as to enter the small channels of the medium, and having arrived at its under surface must there wait till the accumulated gravity of many particles at last compels them to leave the under surface of the medium, and drop into the reservoir.

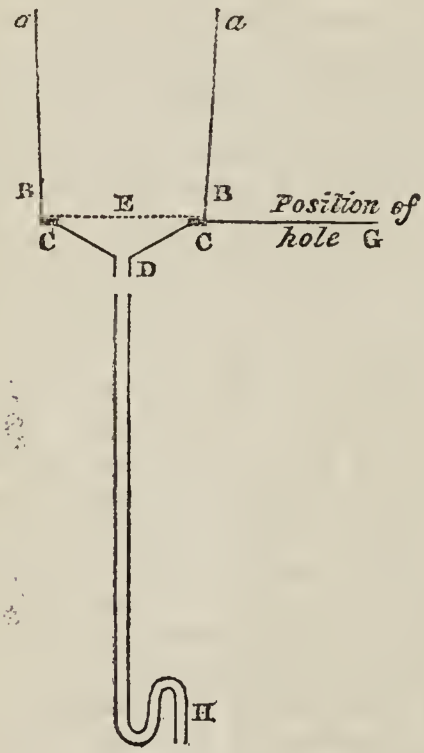
The operation is thus necessarily slow. Practically it is even more prolonged, for we never filter liquids already bright, but only those from which we wish to separate minutely attenuated solid matter. The difficulty in such cases increases each moment of the operation, for the deposited solid matter renders still smaller the orifices in the medium through which the pure liquid has to pass, and thus adds something to the amount of force resisting the transmission, until at last the patience of the operator is fairly exhausted.

Now it is under such circumstances, and for the conservation of this great quality "patience," that various "aids" to filtration have been proposed, the chief of which have aimed at the acceleration of the process, by means either of hydrostatic or of aerostatic pressure. I will not trouble you with the enumeration of all the forms of apparatus designed to this end, but may just mention that upon the former principle instruments have been constructed in which the under surface of the box already alluded to, modified in shape, has been converted into the filtering medium, and by continuing the tube to the height of a few feet, and maintaining it full of the liquid to be filtered, a great statical pressure has been obtained upon the medium equal, as you will remember, to the weight in the tube, multiplied by the number of times the area of the medium exceeded the bore of the tube. Aerostatic pressure has also been produced by instruments which contrive that the liquid to be filtered be placed in a closed vessel above the medium, and that air be condensed upon it by means of a syringe. The same practical effect has been sought by an arrangement which exhausts the vessel beneath the medium of portion of its air, by which means a differential pressure upon the upper surface has been brought about. The exhausting apparatus in these cases has been a pump or syringe, to be worked by mechanical agency.

Now, though many of these instruments have been very ingeniously conceived, they have been all open to certain practical inconveniences. In the hydrostatic apparatus the force employed was so great that it was necessary from the first to construct the medium of proportionately strong and close texture, hence the resulting advantage was proportionately decreased, and in the contrivances depending for their result upon aerostatic pressure the necessity for the almost constant use of the pump was almost as great a trial of the patience as was the original dilemma.

In the instrument I am about to describe I have endeavoured to reap all the aid which the scientific disposal of natural forces could bestow, and at the same time to absolve the operator from all but a minimum of attention and labour.

The apparatus consists of a cylindrical vessel *a a* B B of pure tin, slightly smaller in



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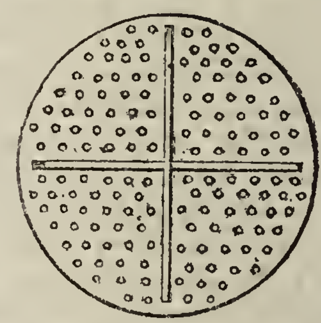

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diameter at the bottom than at the top. The smaller end is provided with a ledge, C, from which the bottom slopes to a central spout, D. A perforated plate of tin, E, strengthened at the under side by cross pieces of the same metal, rests upon the ledge. A ring of tin, F, a quarter of an inch thick, strengthened with cross pieces, is also provided. Upon this ring the filtering medium, flannel, calico, felt, etc., is stretched, and the whole is placed (medium downwards) upon the perforated plate. The ring should be so contrived as to press the filtering-medium tightly against the sides of the vessel, and yet just to rest upon the perforated plate. A small hole, G, is drilled horizontally through the ledge, opening into the instrument close under the perforated plate. A tube is then provided, of any length, from one foot to thirty, and at one extremity is reversed upon itself twice. This tube may be of various materials, but on the whole vulcanized india-rubber is the most convenient. In that case the bent piece at the end should be of some solid substance, such as glass.

To put the apparatus into action, stretch the filtering-material over the ring, F, and press it into its place upon the perforated plate, E. Attach the tube to the spout, D, and close the extremity, H, with a cork. Pour in the liquid to be filtered. A portion soon passes through the medium and fills the tube, the air escaping through the small hole, G. As soon as the liquid begins to escape at this hole, stop it with a little wax; remove the cork from H, and the action commences.

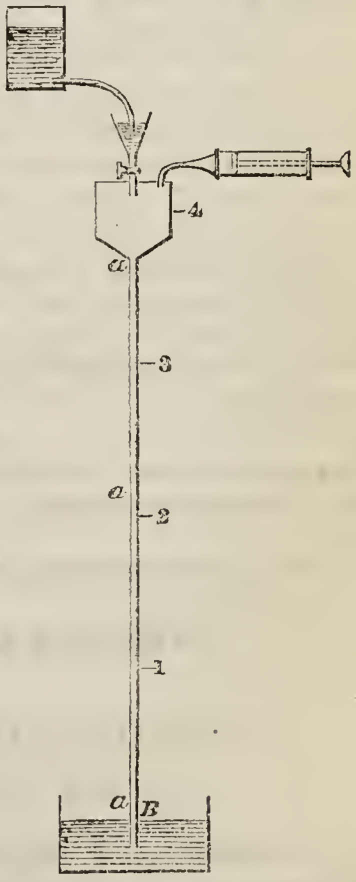
The dimensions of the instrument and the material of its construction will, of course, vary with the purpose for which it is to be employed. That which I have had made for my own use is of pure tin. It is ten inches high, nine inches in diameter at the larger, and eight inches at the smaller end. The ledge is one-third of an inch deep, and the tube of india-rubber is four feet long. I find this elastic tube very convenient, for, as the necessity for pressure is not so urgent at the commencement of the process as subsequently, when the filtering medium has become choked, the operation can be commenced with efficient result by bringing the receiver to within a few inches of the bottom of the apparatus, and the column can be gradually lengthened and the effect proportionately increased by simply lowering the receiver, to each new position of which the elastic tube readily accommodates itself.

With this instrument I have filtered to perfect brightness eight gallons of turbid solution within the hour, and have had the satisfaction of seeing the last ounce pass through almost as quickly as the first.

This is my description of the instrument originally published in the Transactions of the Pharmaceutical Conference, and to confirm its practical utility I venture to quote Dr. Attfield's experiments with my own instrument. He found that when the orifice of the delivery-tube was raised to various distances from the upper surface of the liquid in the apparatus, the level of which was kept constant, the results were:—

At 1 foot 34 oz. in a given time.
„ 2 feet 57 oz. in the same time.
„ 3 „ 73 „ „ „
„ 4 „ 87 „ „ „

clearly showing, that by simply lowering the orifice of the delivery-tube (that is lengthening the column) from one foot to two, three, and four feet, we are eliciting the manifestation of some force of very considerable power. As some of my scientific friends do not view the cause of this result quite as I do myself, I shall trouble you with my version of the phenomena and their explanation.



a a a is supposed to represent an air-tight box terminating in a tube which opens under the surface of a trough of water. Into the upper surface of the box is fitted a tube supplied with a stopcock and opening upwards into a funnel which is kept filled with water. There is also an exhausting apparatus communicating with the upmost part of the box. Now, if the stopcock be turned so as to admit the entrance of, say, sixty drops of water per minute, that quantity will drop through the apparatus into the trough. The pressure of the air being the same both within and without the apparatus, the level of the water at point B is undisturbed. If the syringe be now set in motion, a portion of the air is withdrawn from within, and external atmospheric pressure begins to manifest itself. This pressure is felt by every part of the apparatus, including the stopcock and the extreme orifice of the tube. Both these parts being, as it were, stopped with water, a similar kind of effect is attempted to be produced at both the top and the bottom of the instrument, and the liquid at both points is driven inwards. But as there is considerable resistance to its passage at the top and none at the bottom, it ascends freely at the latter, to a height depending upon the amount of air withdrawn, say to one foot, and, at the former, the effect is simply increased dropping. But this dropping, though continuous, does not alter the level of the water in the tube, for as many drops escape into the trough as enter at the stopcock. If the pump be now again set in motion more air is abstracted, the pressure from without increases, forcing the water still higher in the tube and still more rapidly through the stopcock. The same results, varying only in degree, would attend the continued abstraction of fresh portions of the air by the pump; the water would gradually rise to two, three, four feet in the under tube, until at last it communicated with the small stream issuing from the point of the stopcock.

Now, throughout these processes, the exhausting pump has clearly been the agent to bring about a partial vacuum, and a consequent differential pressure of the air,—the column of liquid has only been the result and the measure of the existence of that partial vacuum. The column produced and maintained by the agency of a force superior to its own density, exerts no inherent potentiality,—the liquid which drops into it at the top drops out of it at the bottom, in virtue of the gravity of those dropping portions themselves; the column itself remains one of the walls, so to speak, of the apparatus, helping to maintain the vacuity, and differing only from the other portions of its walls in being permeable by the liquid dropping into it. And if, as I have asserted, the rate of dropping through the stopcock increases in some relation to the height of the column, that increase must be clearly due, not to the column, the liquid wall of the instrument, any more than to its solid walls, but to the differential atmospheric pressure brought about by the arrangement.

This instrument, therefore, I designate a contrivance to illustrate the operation of aerostatic force, and, as far as I can see, no other force is immediately concerned in the experiment we are supposed to have made with it.

And my filter resembles it exactly in all that concerns the principles of its action. The dropping apertures are many, instead of single; and I get rid of the air from within by simply filling the apparatus with liquid at once, instead of employing the aid of a pump. The external pressure, whatever its amount, we have seen to operate over every portion of the instrument alike. It signifies nothing, therefore, how many dropping apertures my filtering-medium may possess, provided the orifice of the delivery-tube be sufficiently large to allow freely the escape of all the liquid passing through them,—and the column being, as I have stated, the "measure" of the vacuity, and consequently of the power evoked, the pressure upon the upper surface of the medium will be equal to the weight of the under column multiplied by the number of times the area of the medium exceeds the area of the column.

It is this great amount of force which (I think by simple means) I have succeeded in bringing to "aid filtration."

I must just add a few words upon the quantitative results of the employment of this force. You will remember the law of Torricelli, as interpreted or enlarged by Dr. Attfield, declared the rate of flow of liquids from apertures to be in proportion to the square roots of the powers operating. According to this law, the rate of flow from my filter should be in proportion to the square root of the length of the column. Now the actual rate, as above quoted, shows a greater increase than that law would justify; but, I think, when we remember the amount of statical force evoked, and bear in mind that the medium consisted of material to some extent expansible, the excess may be fairly attributed to the very probable enlargement of the pores of the medium under the influence of the pressure. Had we employed a medium of absolutely rigid material, and experimented with perfectly pure water, I do not believe this apparent difficulty would have appeared.

I wish to state, in reply to some inquiries that have been addressed to me, that I do not manufacture or sell the instrument, but simply suggest it for the consideration of my fellow-pharmaceutists.

ORIGINAL AND EXTRACTED ARTICLES.

IS CHLORODYNE SUBJECT TO A MEDICINE STAMP?

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—I beg to hand, for publication, the subjoined correspondence for general information to the trade; it is relative to a public announcement by Mr. T. Barling, of Weymouth, stating that he had received an intimation from the Inland Revenue Office, that the Chlorodyne sold by him was not liable to the patent medicine duty.

I applied for this information that I might be able to give a reply to several communications I had received on the subject.

The decision of the Commissioners of Inland Revenue is quite conclusive, that no remedy under the name of Chlorodyne can be sold without the Government stamp.

Yours truly,
J. DAVENPORT.

33, *Great Russell Street, Bloomsbury,*
March 26, 1866.

"*To the Commissioners of Inland Revenue.*

"Gentlemen,—You will greatly oblige by informing me 'why' Chlorodyne, prepared by Mr. T. Barling, is exempt from patent medicine duty.

"I beg to inform you, as on a previous occasion, that the word 'Chlorodyne' was coined by Dr. J. Collis Browne to represent a particular remedy advertised largely as a cure for certain diseases.

"Now, your reply to me, on December 22, 1865, states that Chlorodyne cannot be sold, under any circumstances, without medicine duty, quite irrespective of the wording of the label, therefore I trust you will not consider me intrusive in asking the reason of the exemption in the case of Mr. Barling, whose preparation is a secret remedy, and sold with the full understanding that it possesses the properties of the Original Chlorodyne of Dr. J. Collis Browne, whose medicine is generally prescribed and ordered simply as 'Chlorodyne,' same as advertised by Mr. Barling (see enclosed handbill).*

"I beg further to state that I solicit this information on behalf of many in the trade who have written to me for an explanation.

"If any exemptions with Chlorodyne are allowed, it will lead to much confusion, and evasion of duty; whereas the decision recently announced by your Honourable Board, that Chlorodyne under any circumstances must pay medicine duty obviates all difficulty in the matter.

"You will readily perceive how unjust it would be to allow a pirated article to be free of duty whilst the original and only genuine was heavily taxed.

"I am, Gentlemen,
"Your very obedient servant,
"J. T. DAVENPORT.

"33, *Great Russell Street, Bloomsbury,*
"*March* 15*th*, 1866."

(REPLY.)

"*Inland Revenue, Somerset House,*
"24 *March*, 1866.

"Sir,—The Board were not aware until the receipt of your letter of the 15th instant, of the nature of the handbill issued by Mr. Barling, of Weymouth, in reference to his Chlorodyne.

"The Board are of opinion that the preparation prepared and vended under the designation of "Barling's Chlorodyne" is liable to the medicine stamp duty, and they have so informed Mr. Barling.

"I am, Sir, your obedient servant,
"T. SARGENT.

"*To Mr. J. T. Davenport.*"

NOTE ON THE BOURNE WATER.

BY DR. ATTFIELD.

It may be worth while calling the attention of chemists, and, indeed, of all interested in water-supply, to a curious natural phenomenon to be seen just now in the neighbourhood of Croydon. Between twenty and thirty millions of gallons of water per day are rushing along channels which a few weeks ago

* The bill referred to was forwarded to me by a wholesale firm seeking information.

were dry, and which have been dry for years. This river, for it is a river, is known as the Bourne, and rises beyond Caterham at a point about six miles from Croydon. It flowed to some extent about six years ago, and about eight years before that time, and is said to make its appearance at an average interval of seven years. But probably many such periods have elapsed since the volume of water was equal to what it now is, for the culverts and courses which seem to have been, at some time or other, especially constructed to carry off a large body of water, are now utterly insufficient for their purpose; the result being that roads, meadows, plantations and gardens are flooded, cottages reduced to the insular or peninsular condition, villas detached from the mainland as well as from one another, and the existence of many "*eligible* plots of building land" indicated only by the naked post and board which stand up in the waste of waters like the warning-beacon of a wreck in the river Thames.

As the Bourne rises among the chalk-hills at the head of the Caterham valley, the quality of its water might be expected to be that of an ordinary chalk-water. And it is so. A specimen taken by the writer from one of the many little outbursting arteries at the source of the river was clear and bright, though not what would be termed sparkling, of pleasant taste as if well aerated, and quite inodorous even after standing in a warm place for some days. The total amount of solid matter in it was 20 grains per gallon. Nearly the whole of the latter was chalk, communicating *temporary* hardness, equal to 16½ grains of that substance per gallon. When the water was boiled, the chalk was all deposited as a fine powder, leaving in solution 3½ grains of what analysis indicated to be a mixture of sulphates and chlorides of calcium, magnesium, and sodium, causing slight *permanent* hardness. The water contained a mere trace of organic matter. Obviously, therefore, the Bourne supplies a potable chalk-water of average quality, and not, apparently, presenting any feature sufficiently abnormal to render more minute analysis of any value.

It may be as well to add that the Bourne is not the only "intermitting" spring in England. The most generally received theory of the cause of such phenomena is that the reservoir or basin in which the rainfall of a district collects has a siphon-formed channel running from its base upwards, after the manner of the spout of a tea-kettle, turning downwards again, much as a flexible tube fitted on the kettle-spout would do. If the kettle be supposed to be filled with a porous mixture of pebbles, chalk, etc., the illustration will be more accurate. Such an arrangement, as is well known, would yield no stream until the water had risen in the basin to a level with the highest part of the channel, when the current would at once commence, and not cease till the basin were empty. The stream would again flow when the water in the reservoir had accumulated to a sufficient extent, and so on.

17, *Bloomsbury Square, March 30th*, 1866.

LIQUOR FERRI PERCHLORIDI.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In an article on Liquor Ferri Perchloridi, published in the October number of the Pharmaceutical Journal, it is stated that the only way of obtaining a pure solution of perchloride of iron consists in dissolving the anhydrous salt in distilled water. However, there is another mode of preparation, now generally resorted to in France, where it was first made known about five years since, by M. Adrian, pharmacien.

Thinking it might be interesting to some of your readers, I will briefly state the "modus faciendi:"—A solution of *protochloride* of iron is made with hydrochloric acid and iron wire, care being taken to prevent the access of air as much as possible. This solution is poured in a Woolf's flask, and a current of pure chlorine gas is made to pass through it until the *proto*chloride is converted into *per*chloride. Then, to remove the excess of chlorine, the solution is exposed in a porcelain evaporating dish, at a temperature *that must not exceed* 50° *Centigrade* (or 122° Fahrenheit). When the required density is obtained, to get rid of the last traces of chlorine a current of air is passed through the solution.

Thus obtained, it is perfectly neutral and transparent, and will keep so for any length of time, without forming a deposit.

This solution, as it is generally made and kept, contains 26 per cent. of anhydrous perchloride of iron; but, on being further diluted with water, it is not more liable to alteration. On the addition of spirits of wine, a slight deposit will take place after some time.

It will be observed that the superiority of M. Adrian's process consists in not suffering the solution to boil, and in conducting the evaporation at a temperature not exceeding 122° Fahrenheit.

If you think this sufficiently interesting, you will insert it in your next number.

I am, Sir, yours respectfully,
E. DUPREY, *Pharmaceutical Chemist.*

Jersey, March 16, 1866.

GELATINE CAPSULES FOR BOTTLES.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Dear Sirs,—The appearance of Mr. Haselden's interesting paper, upon the employment of gelatine for capping bottles, in your last number, has induced me to offer a few remarks relative to my own connection with the subject.

The author of the article in 'Temple Bar,' I have every reason to believe, is a member of the literary profession lately located in Leicester, and the whole of that portion of his paper relating to the employment of gelatine in place of metal, is simply a repetition, word for word, of information he obtained from me a week or two before that number of 'Temple Bar' appeared. I have been quite unable to ascertain his address, as he left Leicester just after the article appeared, or I should have called his attention to his own aptitude for appropriation,—literary kleptomania being a malady of which the patient is, in many cases, loftily unconscious.

I have used gelatine for bottle capping for nearly two years. During the summer of 1864, we had complaints from several colonial customers, of photographic varnishes, which we export largely, percolating through the cork, (from pressure caused by expansion while passing the heat of the tropics,) dissolving the wax and causing much loss to the purchaser. I thought of gelatine, and proceeded to test it against damp. I laid a bottle capped with it on a damp cellar floor for three months, at the end of that time the capping was decidedly harder than when it was first placed there, and we then adopted it in our warehouse for all photographic spirituous and ethereal preparations, for ammon. carb., potass. bicarb., ol. ricini, and, where applicable, for every article we put up in bottles or jars. To seven pounds of the lightest-coloured glue we can obtain we add about ten ounces by weight of Price's glycerine, and about three pints of water; when the glue has absorbed this, we place the whole in a water-bath, and add sufficient pigment,—Derby red or emerald green we find best, to form a neat clean-coloured capping,—also more water if required. I recollect distinctly that I suggested transparent capping to my enterprising friend of

'Temple Bar,' but we have never used it, I have since adopted a far more beautiful method, which I shall be happy to describe when satisfied that it will stand the test of a few months' time. Above a year ago, we first sent out photographic varnish capped with gelatine, to Mr. Atkinson, a large photographic dealer in Liverpool, who immediately wrote for a quarter of a hundredweight of the same material for his own use; we also sent varnishes capped with it to Mr. Ramsden, of Leeds; Messrs. Manson and Swan, of Newcastle-on-Tyne; and Mr. Solomon, of 22, Red Lion Square, London; and during last summer, to Mr. Jas. How, of Foster Lane, Cheapside. All these gentlemen are large photographic manufacturers and factors, and will, I am sure, corroborate my statement.

If I had thought that what seemed to me an insignificant little dodge was worth parading in 'Temple Bar' with such a flourish of trumpets, I should have sent it to the Pharmaceutical Journal, though I do not think it would have attracted much attention but for the general metallic-capsule consternation with which we are all afflicted. I am glad that Mr. Haselden has taken the subject in tow, as it will thereby enter the Pharmaceutical domain under favourable circumstances.

I am, dear Sirs, yours faithfully,

FREDERICK PARSONS.

30, *Gallowtree Gate, Leicester,*
March 22, 1866.

EARLY CLOSING.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

I have read, with much pleasure, an article written by a Major Associate in this month's Journal. I appreciate it the more, because his views exactly coincide with my own, especially when he says, "We must lessen the hours of labour, close our doors on Sundays, and be less ready to compete for the stray pence that may come in at unseasonable hours;" and it is through what we have done in this respect at Wolverhampton that has induced me to send this communication, hoping it may incite other towns to follow our example.

The Chemists of this town, with one or two exceptions, close their establishments every evening, except Saturday, at half-past seven; and I only know of two instances where the door-shutter is removed on Sundays. Of course this has not been done on the spur of the moment, and the rules to be broken in a week or two; for Wolverhampton, like most other towns, boasts of a goodly number of chemists, and consequently a good deal of opposition, so that the necessary caution was exercised in the matter. The origin of it was this: some years ago there was a desire expressed by many of the shopkeepers to lessen the hours of business, and the principal ironmongers and drapers agreed to close at seven o'clock,—some of the gentlemen occupying a good position in the town as magistrates, etc., and having agreed to do so, they kept their word, so that any one passing through the centre of the town a few minutes after seven would always find these places closed. Some energetic assistants, again, agitated the affair, with a view of making it general, and accordingly caused a large and influential meeting to take place about six months ago. One of the speakers was one of the tradesmen who had closed at seven for years, and he said, when he was first asked to do so, he hesitated for some time, and at length signed the paper, with fears lest business should suffer; but he was happy to say that it had proved otherwise, and strongly advocated the early closing movement. Several of our clergy and others spoke in favour of it, and promised to use their influence in that direction. The consequence was, the majority of the shopkeepers exhibited cards in their windows, and advertised in the newspapers, stating that their establishments would close some at seven others at half-past seven every evening, except Saturday. The public soon became aware of it, and were compelled to make their purchases earlier. The chemists had not as yet done anything; however, Mr. Fleming and myself ascertained the feelings of our fellow-members and others, and they nearly all cheerfully acquiesced; and I am thankful to say that we have now closed punctually at half-past seven for more than three months, and I will further add, that I have had less ringing at my side-door bell after that hour than I have ever had since I have been in business.

I therefore heartily recommend the chemists in other towns to go and do likewise, and also wish to add a few humble suggestions. They must first get the public to know that the shops are always closed at a certain hour, and under no circumstances to keep a light burning in the shop afterwards; if they do, they tempt people to come for that which is not urgent. I consider we are all morally bound to make proper provision for supplying anything of a really urgent nature at all times; on the other hand, it is injudicious to keep a light burning, a door-shutter down, and an assistant there till nine, ten, and eleven o'clock at night, merely for the convenience of our neighbours. It is this that makes our business a toil instead of a pleasure. Why should any one standing in the market-place of a provincial town, at a certain hour at night, see every retail shop closed but a chemist's? It is simply monstrous, and the sooner such a monstrosity is done away with the better,—better for the employer and better for the employed. I appreciate it quite as well as my assistants, for I never feel comfortable in my house till business is over. I dare say some would object, because their neighbours would not close. We have the same thing to contend with here, but we have only one or two instances all over the town. The grand thing is, to get the leading chemists to do it, and if they do sacrifice a few stray pence, it will be more than compensated by the additional comfort they will get by it. I recollect a very old member of our Society telling me, that he always found that the customers who came in just as he was closing were his neighbours, and they generally asked for something that they knew they wanted all the day,—and, as far as my experience goes, there is much truth in it. I therefore sincerely hope that an effort will be made in every town to lessen the unnecessary long hours of a chemist's business, feeling assured, from my own experience and, I believe, that of my neighbours, that none will be losers thereby.

WILLIAM YATES BREVITT.

Wolverhampton, March 14, 1866.

IS PHARMACEUTICAL LEGISLATION NECESSARY?

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—Should any of your readers question the necessity for Pharmaceutical Legislation, I would recommend them to insert an advertisement in the Pharmaceutical Journal for an Assistant, and to examine the replies. Having repeatedly had occasion to do this, I have been struck with the ignorance and superficial education which the answers manifest. Out of eight or nine such letters now before me, three or four of which contain orthographical and grammatical errors of the simplest kind, I send one as a specimen* (without name or address), which, if printed *verbatim et literatim*, may serve to illustrate the low state of Pharmaceutical education amongst apprentices and assistants generally. Those letters, however, which contain no such errors as I have

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* See p. 515.

alluded to, evidence in their composition, etc., very superficial knowledge and imperfect education. Thus—to give a few instances—a young man informs me that he belongs to the "Church of England *religion*;" (!) another—a Major Associate too, but rather short-sighted—wishes to know the "whereabouts" of my business; a third states that he requires so much salary and "*no less*;" and a fourth gentleman, who encloses his carte d'visite (*sic*), remarks, "I am 5 feet $4\frac{1}{2}$ inches *without my boots*. . . . I require £45 per annum." I am tempted to ask here, why £45? Can there be any occult relation between the height and the salary required; as my correspondent shows a generous disregard of the "$4\frac{1}{2}$ inches" in valuing his services, or rather himself, at £9 per vertical foot yearly?

I could, of course, give instances of a far different kind, doing credit to the writers, but they would bear a lamentably small proportion to those illiterate productions I have referred to. I think facts such as these conclusively prove that nothing will prevent ill-educated young men from entering the trade, but the existence of *compulsory* examination. Much as the Society has done,—and I heartily acknowledge its labours,—in raising the educational status of chemists and druggists, and in supplying competent and careful assistants, there is, and always will be, a substratum of the ignorant and incompetent, which no voluntary examination can possibly reach. Probably one-third of the apprentices and assistants now employed in the United Kingdom, could not write a sensible letter in correct English, with proper spelling and punctuation, and in this day of universal enlightenment, surely this is no slight disgrace, and calls for prompt efforts on the part of those who have the good of these classes at heart, and desire to enhance the safety and security of the public. I believe we cannot further the welfare of the trade or of society more truly, than by guarding against the admission into the former of those lacking a certain degree of elementary knowledge, and I would therefore suggest that in any compulsory measure (besides the examination required before entering business) an analogous examination to the Preliminary of the Pharmaceutical Society, be passed by every apprentice, before his indentures can be legally executed; such examination to be stringently enforced, and to include Latin, Arithmetic, English Composition, and Elementary Science; the power to write a short sensible letter, with correct spelling and punctuation, being a *sine quâ non*. Were the Legislature to make even *such* an examination *compulsory*, though refusing for the present one more advanced, a very beneficial change must result. Indeed, I am inclined to regard this kind of examination as most important, for it may be reasonably argued, that if a young man has this elementary knowledge, he will endeavour to obtain that which is specifically connected with his calling, of his own accord, whereas without the former, such efforts, if put forth under an external pressure, will be with difficulty successful, and apart from it are not likely to be put forth at all.

Whatever arguments may be employed to oppose the practical value and urgency of establishing a general compulsory examination before entering business, no one, I presume, will question its expediency with reference to apprentices, or assert that it would be likely to involve any evils of a practical kind. I will not undertake to argue with any one who thinks apprentices would be less diligent and earnest in pursuing the practical part of their calling, through subjection to examination before entering it, but any trade changes, occurring through their ranks being recruited,—as they then would be,—from a higher class of society than at present, must plainly work for the general good, however individually resisted. A better class of apprentices would naturally produce a better class of assistants and employers, rendering the trade more uniform in its character and less dependent on locality. A compulsory examination,—whether of apprentices or employers,—(besides facilitating legislation on such points as the sale of poisons, a matter indirectly related to the trade, but directly involving the public good)—would probably thin the ranks of those who possess but an indifferent claim to the title of chemist and druggist, whilst it would afford legitimate chemists a position with reference to other trades to which they are honestly entitled, but which they can obtain by no other means.

As I conceive, the Pharmaceutical Society was founded in order to obtain legislative recognition for the *entire* trade, and not merely to establish and perpetuate a privileged clique within it, I would urge on the Society and on all Pharmaceutical Chemists, the duty of unceasing effort in this direction. Every private and class feeling regarding the admission of all chemists to an equal status at the time of the passing of a compulsory Act, should without doubt be sacrificed to the one great national object which would be thus secured; and I trust that the Society will take steps to bring this question before the Legislature if possible during the present session of Parliament.

I am, Sir, yours faithfully,
A MEMBER BY EXAMINATION.

March 13th, 1866.

November 3rd 1865

To Mr. ——

Dear Sir—In reply to yours of to day age $21\frac{1}{2}$; reference by application to Mr. —— Salary expected 30£ has a good knowledge of the general country trade I have been 5 years in the business hopeing to hear from you as early as possible stating hours of business &c

I am yours faithfully

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A WORD TO CHEMISTS' APPRENTICES.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—"A Major Associate," in an able letter in your last issue, headed "Chemists' Associations," expatiated on the present unsatisfactory condition of our profession in the country, and urged upon the members the necessity of taking a deeper interest in trade matters. The complaint and the suggestion are alike true, and all the members of the trade would do well to read and ponder over them. But there is another class of individuals in the profession, besides assistants and those in business for themselves, to whom this complaint and suggestion might equally apply. I allude now to those who are apprenticed to the "trade, art, and mystery of a chemist and druggist," and it is to them, as one of themselves, I appeal.

It is a lamentable fact, and one which cannot be denied, that a large proportion (I think I am within the mark when I state three-fourths) of apprentices hate the trade. It is associated in their minds with everything that is uninteresting and repulsive. In their eyes, a brilliant halo seems to surround clerkships, and even the mechanical trades, but no presiding genius smiles on the practice of pharmacy; rather some evil gnome has frowned upon it, and converted it into a slavish, tedious, monotonous routine. A grocer's shop presents to them a kind of airiness and lightness and cheerfulness, but there is evidently one atmosphere for the grocer's store and another for the chemist's dispensary; for in the latter all is stern, plodding, uninteresting.

I go a step further. I have said that out of the total number of chemists' apprentices, three-fourths are dissatisfied with the occupation to which they have committed themselves; and I say more, that of these three-fourths one-fourth leaves the trade at the first opportunity that presents itself; the remaining two-fourths continue in the trade when their term of apprenticeship has expired. But why? I ask. Is it because round pharmacy cluster their warmest sympathies and their most ennobling aspirations? Is it because hence they derive some of their highest and most lasting pleasures? Is it? I trow not. Is it not rather (and while I acknowledge the fact I mourn over it),—is it not rather, I say, because they are obliged so to do? They must either continue their connection with the trade or they must starve. Two evils are before them, and, coming to the conclusion that on the whole the continuance in the trade is preferable to starvation, they choose the smaller evil. Fain would they leave the drug counter; they would be almost ready to worship one who would offer them a situation in some other department of labour; but no such offer comes, and so they resolve to make the best of a bad job, and, with a sigh, they enter on the life-long routine of slavery and monotony.

Is such a state of things at all explainable? I think it is. A chemist advertises that he is "open to receive a well-educated and respectable youth" as an apprentice. Paterfamilias, who has such a son, sees the advertisement, and as he imagines that the trade of a chemist and druggist is so essentially "nice, clean, and respectable," he resolves his son shall enter the drug business. Paterfamilias and the chemist having agreed upon the terms, the youngster enters his apprenticeship. Bright hopes light up the horizon, and enthusiastic anticipations beam along the vista that stretches before his mental sight; but, alas! all his bright hopes are soon dissipated, and his glowing ideas of the cleanliness of the trade soon brought to confusion; and rolling out horse-balls, powdering blue vitriol, linseed meal, black resin, etc., mixing sheep-dipping composition and blacking, together with late hours, soon render him disgusted with his occupation. Every day increases his dislike and intensifies his disgust, until in some cases he curses the day he was apprenticed. Have I painted this in colours too glaring? Have I, to make the picture more conspicuous and striking, dragged in abuses which do not exist, and never have existed? I think not.

And more. Because the apprentice hates the trade, he takes no interest in it; because he dislikes it, he does not trouble his head with studying for it; if he does know anything, it has been forced upon him by the ordinary run of his daily work, but he never goes out in search of knowledge. No midnight lamp lights up the pages of his Manuals of Botany or Chemistry as he pores over them; no early morning sun, as it throws its rays across the sky, surprises him at study. "Bother Latin, botany, chemistry, materia medica, and everything else," he says, when you speak to him on the subject. And so it goes on; the apprentice becomes an assistant, and then the assistant sets up in business for himself, and then an opportunity is afforded to some scandal-monger to stamp the general body of chemists and druggists as ignorant and incompetent charlatans.

Now where are we to look for the remedy for this state of things? Glad am I to state that such a remedy does exist, and that it is within the reach of every one who possesses all his faculties.

The desideratum obviously is this: if we can only get to take an interest in our trade, the thing is achieved immediately. A man is always enthusiastic in any cause which he really loves; and so we shall only become studious and contented when we begin to like the trade.

How, then, may the interest be created? It may be accepted as an axiom of universal application, that an individual, in order to proficiency in any branch of study or labour, must place before himself some particular object for which he must strive. All the great men who have turned the world upside down, who have won for themselves positions of power, affluence, and honour, have so done because they have set some object before them, and they have striven, and laboured, and toiled until they have gained that on which they have set their heart; then they have set before them another aim, higher and more difficult than their former one, and their toil has been renewed until once more their labours are crowned with success; and so they have gone setting their mark higher and higher each time they succeeded, until there now they stand, "head and shoulders" above the rest of the people.

Let us from them take a lasting lesson. If we want to take an interest in our trade, and if we are discontented with our present lethargy and indifference, let us set before us some object for the accomplishment of which we must strive and labour. Such an aim the Pharmaceutical Society supplies. It offers to the apprentice its medals and certificates, its honours and scholarships; and as he studies in order to pass these tests, an interest is immediately raised in trade matters, and so it goes on, until that which he once hated now he learns to love; and even horseball-rolling, and blue-vitriol-powdering, and furniture-paste-making are seen in a new light, and even become auxiliaries in increasing his knowledge and deepening his interest. My advice, then, to all apprentices is—Resolve to pass the Pharmaceutical examination; study Cæsar and other subjects until you can pass the classical examination; this done, do not relax your exertions, but go in for the Minor Examination, the Herbarium Prize, the Junior Bell Scholarship. Take them one after the other, and work for each resolutely, earnestly, and continuously, until you conquer. And while you thus keep the aim steadily in view, do not regard it with any fear lest you should never obtain it; when you decide to strive for it, also make up your mind to obtain it. Plucking is a contingency you must not even entertain for a moment. "Can't" is a word you must entirely expunge from your vocabulary. Here, obstinacy is a virtue; nail your colours to the mast, and stick to them.

Taunts you will have to endure; those associated with you in the shop, too lazy to tread in your footsteps, may jeer at your bold attempt, and try to dissuade you from your purpose; but heed it not. Tell them that neither laughing nor frowning, neither coaxing nor threatening, can deter you. Say—

> "I pray you think you question now with me.
> You may as well go stand upon the beach
> And bid the main flood bate his usual height.
> You may as well use question with the wolf,
> Why he hath made the ewe bleat for the lamb.
> You may as well forbid the mountain pines
> To wag their high tops, and to make no noise
> When they are fretted with the gust of heaven.
> You may as well do anything most hard,
> As strive to alter that (than which what's harder?)
> My res'lute heart."

Trusting that this may fall into the hands of a fellow-apprentice who may be stimulated by it to search diligently for "the hid treasures" that lie all glittering under the apparently unlikely soil of a general country druggist's trade,

I remain, yours obediently,

A Registered Apprentice.

Bury St. Edmund's, March 19th, 1866.

THE LATEST THING IN FEEDING-BOTTLES.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—A few days since, I was informed by a chemist in West Hartlepool (and he afterwards afforded me ocular demonstration of the fact) that he is constantly applied to by the working classes for the spare fittings of sixpenny feeding-bottles, under the pretence that they have already purchased a bottle but have lost the fittings. Having obtained the fittings (for which they pay $2\frac{1}{2}d.$, they then attach them to an empty ginger-beer, lemonade, or wine bottle, and thus have *a complete feeding bottle for twopence-halfpenny.*

Couple this with the fact that india-rubber teats are now commonly retailed in the north of England at *three-halfpence* each, and are we not forced to exclaim, *Tempora mutantur, et nos mutamur in illis ?*

I think that the majority of your readers will admit that it is a great pity that sixpenny feeding-bottles were ever introduced to the trade,—and they were only introduced as a mode of rivalry between the wholesale sundry houses; they have always been a source of loss, rather than profit, both to the manufacturer and the retailer, besides the fact that the sale of such twopenny-halfpenny articles is calculated to lower the dignity of the trade.

Yours, etc.,

Scarborough, March 20th, 1866. J. J. H.

THE SALE OF STEEDMAN'S SOOTHING POWDERS SINGLY.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

116, *Balls Pond Road, March* 7, 1866.

Sir,—Wishing to know whether chemists could legally sell Steedman's Soothing Powders singly, and failing to get a satisfactory reply to the question from the proprietors, I wrote to the Commissioners of Inland Revenue for their opinion. Their reply I enclose for the information of the trade.

I am, Sir, yours, etc.,

WM. YOUNG.

"*Inland Revenue, Somerset House, London*,
"*6th March*, 1866.

"Sir,—The Commissioners of Inland Revenue have had before them your letter of the 26th January last, requesting to be informed whether it is legal to open a stamped packet of 'Steedman's Soothing Powders,' and retail the powders separately.

"In reply, I am directed to acquaint you that in strictness a penalty is incurred by selling any of the powders in question, under the circumstances mentioned, without a proper stamp.

"I am, Sir, your obedient servant,

"T. SARGENT."

THE BENEVOLENT FUND.

TO THE SECRETARY OF THE PHARMACEUTICAL SOCIETY.

Dear Sir,—I have been requested, as President of the Bath Chemists' Association, to forward you two guineas, as a donation from the Society in aid of the fund for defending the actions Mr. Betts is bringing against retail chemists.

I have also much pleasure in forwarding you a cheque for £12. 3*s.* 6*d.* for the Benevolent Fund of the Pharmaceutical Society. I would say that, when a few months since my friends here selected me as their President, I considered that one of the duties devolving on the appointment was to bring the claims of the afflicted and needy in our special calling prominently before them. Believing at the same time that uncharitableness is the unenviable possession of the few, but thoughtlessness the fault of the many, I personally solicited subscriptions from the chemists in Bath, and I am very pleased to say that in four cases out of five my appeal met with a ready and hearty response, not only from members of the Pharmaceutical Society, but from the chemists generally. As years roll on, I doubt not, our members will increase, and consequently applicants for assistance also, to augment the Benevolent Fund. I would therefore suggest for the consideration of the Council, whether they might not with advantage follow the example of other institutions, by soliciting their friends throughout the kingdom to act as stewards, and use their exertions in obtaining subscriptions on behalf of so good a cause; an appropriate time for the meeting would, I should think, be the Conversazione of the Society. And here I would say that I endorse most fully Mr. Atherton's proposition for the necessity of an Exhibition of Pharmaceutical and other apparatus, and I think, with Mr. Ince, such collection ought to be at some acknowledged centre and recognised institution, —what place therefore so central as London, and what institution so capable of conducing to its success as the one in Bloomsbury Square? With such an exhibition I entertain no doubt plenty of representatives would be found, and, for the provinces at least, the visit would be one both of pleasure and profit.

I remain, dear Sir, yours truly,

R. D. Commans.

Bath, *March*, 1866.

[We hope the example thus set will be followed elsewhere. A few such active canvassers as Mr. Commans, of Bath, and the Local Secretary at Durham, would soon swell up the lists of donations to the Benevolent Fund. It will be seen by reference to the list at page 492, that several of the subscribers are unconnected with the Society.—Ed. Pharm. Journ.]

THE BRITISH PHARMACOPŒIA.

The following letter from "An Hospital Surgeon" appeared in the 'Lancet' of March 17th:—

"Sir,—As this appears to be the appropriate moment for suggestions respecting the new edition of the 'British Pharmacopœia,' I would venture to make one or two suggestions through your columns.

"The editors of the 'British Pharmacopœia' eliminated altogether the class of 'cerates' of the old Pharmacopœia, replacing many of them, however, by corresponding ointments. There is one, however, which has not been replaced, and which is a great loss to the surgeon: I mean the ceratum hydrargyri compositum (P.L., 1851), which is so frequently employed in the treatment of diseased joints as 'Scott's dressing.' The British pharmaceutists would, no doubt, have us employ the unguentum hydrargyri; but practically this is too soft and greasy, and soaks through the dressings very rapidly.

"Another most convenient mode of administering mercury has been taken away by the removal of the old liquor hydrargyri bichloridi, which contained $\frac{1}{16}$th of a grain in the drachm. A solution of corrosive sublimate is in the British Pharmacopœia, but is forty times the strength of the old *liquor*, and is intended merely for testing. It is obvious that any mistake by a dispenser between the two solutions would be highly dangerous.

"In conclusion, let me assure Dr. Garrod, from practical experience, that his opinion of the value of the tincture of arnica is erroneous, and his experiments respecting the absorption of effused blood fallacious, from not having used the tincture sufficiently strong. The undiluted tincture I find to be a most serviceable remedy when painted upon recent bruises, and a most excellent preventive of 'black eyes.'"

REPORT OF THE CULTIVATION OF CINCHONÆ AT DARJEELING DURING THE MONTH OF OCTOBER, 1865.

From T. Anderson, Esq., M.D., Superintendent, Botanical Gardens, and in charge of Cinchona cultivation in Bengal, to S. C. Bayley, Esq., Junior Secretary to the Government of Bengal, dated the 3rd January, 1866.

I have the honour to transmit herewith the Report of the Cinchona cultivation at Darjeeling for the month of October, 1865.

Report for the Month of October.

I am glad to be able to report the continued success of the cultivation. The number of cuttings made during the month was 9615, making a total number of plants and cuttings in all stages of growth 108,962. The alterations in the mode of growing the plants from which cuttings are obtained has been completed for all the species. The full number of stock plants for cutting (10,000) has been attained in the case of *C. succirubra* and *C. officinalis*, but some months must elapse before the number of stock plants of *C. micrantha* is completed.

As I possess only 142 plants and cuttings of *C. Calisaya*, this valuable species must be cultivated under the shelter of glass for some years longer. During the month 14,500 well-rooted plants of *C. succirubra* were planted in open-air beds, from which they will be transferred in April next to the open ground.

2. The first public sale of Cinchonæ took place on the 2nd October. Three purchasers attended, who among them bought the 1000 plants offered for sale at the upset price of four annas each: only *C. officinalis* was sold.

3. The temperature of the past month has been considerably lower than that of September, the greatest difference being in the mean minimum temperature from the clear cloudless nights favouring radiation.

4. The rainfall has also greatly diminished, only one and a half inches of rain were recorded during the month, making a total fall of 153·08 inches from the 1st January. The mean maximum temperature at the fourth plantation was 80·06. The mean minimum 59·19, and the mean temperature of the month 69·62.

5. At the fifth and lowest plantation, nine observations of the minimum thermometer give a minimum temperature of 61·3.

6. This decrease in the temperature, accompanied by dryness of the atmosphere, has affected the growth of the plants. The period of rest is rapidly approaching when the plants will remain almost dormant.

Number and Distribution of Cinchona Plants in the Government Plantations at Darjeeling on the 1st of November, 1865.

Name of Species of Cinchonæ.	Number in permanent plantations.	Number of stock plants for propagation.	Number of seedlings or rooted cuttings in nursery beds for permanent plantations.	Number of rooted cuttings in cutting-beds.	Number of cuttings made during the month.	Total number of plants, cuttings, and seedlings.
C. succirubra	389	10,000	14,500	14,145	4100	43,134
C. Calisaya	...	23	...	94	25	142
C. micrantha	15	2,539	...	1,420	290	4,264
C. officinalis, including varieties	870	10,000	8,459	31,801	5,200	56,330
C. Pahudiana	5,092	...	...	...	...	5092
Total . .	6,366	22,562	22,959	47,460	9,615	108,962

ON CINCHONA CULTIVATION IN CEYLON.

BY MR. CLEMENTS MARKHAM.

COMMUNICATED TO THE BOTANICAL SOCIETY OF EDINBURGH BY DR. GREVILLE.

Mr. Markham has been deputed by the Government to visit the planters along the western coast of India, and try to induce them to cultivate the Cinchona tree, in order that a new source of supply of quinine may be obtained. He had been visiting and reporting on the Hakgalla Cinchona Plantation, in Ceylon. He says that the site at Hakgalla is well chosen, as closely resembling the habitat of the plants in South America, and he bears testimony to the skill and success with which Dr. Thwaites, assisted by Mr. MacNicol, has conducted the task of cultivating and propagating the quinine-yielding plants. Of the many thousands planted out on a bare slope at Rothschild, exposed to the full influence of light and wind, he also speaks in the highest terms as robust and flourishing. He states that the *Cinchonidæ* in India are pretty certain greatly to excel the parent plants in South America in the yield of valuable alkaloids. So striking is the improvement, indeed, that what are reckoned inferior species in the country to which they are indigenous, vie in their products with the most valuable. It has been proved that not only do the young prunings yield large quantities of quinine, but that by encouraging the growth of Moss and Lichens on the stems, the quantity of alkaloids is increased; and more than this, that if the wounds are at once covered over by Moss, strips of bark, rich in the most valuable of febrifuges, can be repeatedly taken from the same trees without injury to their vitality. Every encouraging element, as far as cultivation is concerned, is therefore present; and to complete the inducements to the Ceylon planters to engage in the pursuit, there will be a market close to their doors. The Government of India, the largest consumers of quinine in the world, are about to establish a manufactory for obtaining the sulphate from the bark, in the Madras Presidency. The red bark of India and Ceylon will fetch as high a price as the *Calisaya* of Bolivia, the most valuable of all the barks (4*s*. per lb.). If the price went down to one-fourth of this sum, we have little doubt the cultivation would pay. The bark could either go to India, or it would be taken at a cheap rate to England as filling-up cargo. Not half-a-dozen years have elapsed since the first plants were introduced into India, and now they are to be found, to the number of at least a million and a half, scattered over the hill-ranges of Ceylon and India, from Hakgalla to the Himalayas—flourishing everywhere, except in hill hollows, where actual frosts prove fatal to them. The Indian Government consider that the progress in the operations has been very satisfactory, and they congratulate Mr. M'Ivor on the important success that has attended his labours in this national undertaking. The oldest plants which were planted out in August, 1862, are now from 8 to 12 feet in height, and from 7 to 13 inches in girth at 6 inches from the ground, well furnished with lateral branches, and present a most robust and healthy appearance. In the oldest plantations the branches of the plants, 10 and 12 feet apart, are now touching each other, and the bark is much increased in thickness. The characteristic markings of the finest Peruvian bark are becoming more and more apparent, Lichens and Mosses being fully developed. The plants are flowering freely, and perfect seeds have already been obtained; in short, there is no room to doubt that the Cinchona can be grown on the Neilgherries in great perfection.

BOTANICAL CONGRESS.

The Committee of the Botanical Congress to be held in May next, in connection with the International Horticultural Exhibition, and under the presidency of Professor A. De Candolle, now comprises the names of James Bateman, Professor Babington, W. Baxter, J. J. Bennett, Rev. M. J. Berkeley, Professor Bentley, W. Carruthers, Professor Daubeny, Charles Darwin, Dr. Hogg, W. Masters, J. M'Nab, A. G. More, Dr. Moore, T. Moore, J. Miers, W. Paul, Dr. Prior, J. G. Veitch, Dr. Welwitsch, Dr. Wight, James Yates, and others. Several papers have already been announced, and it is expected that a large number of foreign botanists and horticulturists will be present.

Gentlemen intending to take part in the Congress should apply to Dr. Maxwell Masters, the Honorary Secretary, at the Office of the Exhibition, 1, William Street, Lowndes Square, S.W.

CAUSES OF THE ASCENT OF THE SAP.

The causes of the ascent of the sap have long been a subject of controversy, and it can by no means be stated that we have even now arrived at any perfectly satisfactory conclusions in the matter. Endosmose, capillarity, and the profuse evaporation which takes place from the leaves, have all been considered as potent agents in producing the upward flow, but even those who have the most insisted on the power of these agencies have admitted that they were not sufficient to explain all the phenomena.

Professor Unger and M. Boehm, in a paper in the Transactions of the Imperial Academy of Vienna, conclude that the rise of the sap is brought about by atmospheric pressure on the elastic walls of the cells. Air enters into the plant, and is distributed throughout its structure by means of the vessels, the air so introduced compressing the cells, and thus pushing their liquid contents upwards.

Quite recently, too, Mr. Herbert Spencer has brought before the Linnean Society his views on the ascent of the sap and the formation of wood in plants. Mr. Spencer's paper excited so much attention, and gave rise to so animated a discussion, that we feel pleased to lay before our readers a brief abstract of the inferences drawn from his observations and experiments, and which has been kindly furnished to us by Mr. Spencer himself:—

"The leading idea in my paper is that the oscillating movements of the stems, branches, twigs, and petioles of plants are largely, if not indeed mainly instrumental, both in producing circulation, and in causing the deposit of woody matter. When any part of a plant is bent by the wind, the tissues on its convex surface are subject to longitudinal tension, and these extended outer layers compress the layers beneath them. Such of the vessels or canals in these subjacent layers as contain sap, must have some of this sap expelled. Part of it will be squeezed through the more or less porous walls of the canals into the surrounding tissue, thus supplying it with assimilable materials; while part of it, and probably the larger part, will be thrust along the canals longitudinally upwards and downwards. When the branch, or twig, or leaf-stalk recoils, these vessels, relieved from pressure, expand to their original diameters. As they expand, the sap rushes back into them from above and below. In whichever of these directions least has been expelled by the compression, from that direction most must return during the dilatation; seeing that the force which more efficiently resisted the thrusting back of the sap is the same force which urges it into the expanded vessels again, when they are relieved from pressure. At the next bend of the part a further portion of sap will be squeezed out, and a further portion thrust forwards along the vessels. This rude pumping process thus serves for propelling the sap to heights which it could not reach by capillary action; at the same time that it incidentally serves to feed the parts in which it takes place. It strengthens them, too, just in proportion to the stress to be borne; since the more severe and the more repeated the strains, the greater must be the exudation of sap from the vessels or ducts into the surrounding tissue, and the greater the thickening of this tissue by secondary deposits. A further part of my argument is that by this same action the movement of the sap is determined either upwards or downwards according to the conditions. While the leaves are active and evaporation is going on from them, these oscillations of the branches and petioles urge forward the sap into them; because so long as the vessels of the leaves are being emptied, the sap in the compressed vessels of the oscillating parts will meet with less resistance in the direction of the leaves than in the opposite direction. But when evaporation ceases at night, this will no longer be the case. The sap drawn to the oscillating parts to supply the place of the exuded sap, must come from the directions of least resistance. A slight breeze will bring it back from the leaves into the gently-swaying twigs, a stronger breeze into the bending branches, a gale into the strained stem and roots—roots in which longitudinal tension produces, in another way, the same effects that transverse tension does in the branches."

Mr. Spencer further supported his views by drawings and descriptions of certain organs which terminate the vascular system in many leaves—organs specially adapted by their structures and positions for absorbing the elaborated sap that has to be drawn back from the leaves for the nutrition of the supporting parts. These structures, to which, as it appears, no one has previously called attention, consist of masses of irregular and imperfectly-formed fibrous cells. Mr. Spencer also showed specimens of some very singular and beautiful structures of a similar nature in the common turnip, which have been equally overlooked by microscopists, although they may even be seen by the naked eye. Great credit is due to Mr. Spencer for his ability and his powers of observation, and it is earnestly to be hoped that he will pursue his investigations in this very important subject. We propose, on some other occasion, to recur to a matter so interesting to all scientific horticulturists; till then we defer further comment on Mr. Spencer's views.—*The Gardeners' Chronicle and Agricultural Gazette.*

KEW GARDENS.

The number of visitors to the Royal Gardens at Kew in 1865 was 529,241, a larger number by 55,934 than in 1864. The number who came on Sundays was very nearly equal to the numbers who came on all the week days added together. The greatest Sunday attendance was 16,842; the greatest week-day attendance 19,849. Dr. Hooker, who has succeeded his distinguished father as director, has to record the acquisition in the herbarium department of two of the most important private collections that existed in Europe,—Dr. Lindley's collection of orchids by purchase, and by gift the herbarium collected in South Africa and South America by the late Dr. Burchell, whose Brazilian collection alone comprises above 50,000 specimens. Dr. Hooker has also to report that the cinchona plantations in India are being immensely extended. An infusion of the leaves is found an excellent febrifuge, and it is therefore desirable that it should be cultivated wherever its foliage is produced in tolerable abundance. From Ceylon ripe seeds of *Cinchona officinalis* have been received at Kew, and transmitted to Jamaica and Trinidad. Mr. Hills, director of the Botanic Gardens at Brisbane, who went there from Kew, reports the complete success of the *Cinchona Calisaya* sent from Kew. From the Cape of Good Hope most valuable reports have been received from Dr. Brown, colonial botanist, treating of the conservation of the forests of that colony, the destruction of which by fire has led to the sterility of large tracts of once well-watered land. The cultivation of the Olive seems to promise to become of great importance there, and some of the best kinds will be procured and transmitted thither. Of once sterile Ascension Island, which we continue to supply with plants, Captain Barnard reports that it now possesses thickets of upwards of forty kinds of trees, besides numerous shrubs and fruit-trees, of which, however, only the Guava ripens. These already afford timber for fencing cattle-yards. When Dr. Hooker visited the island in 1843, owing to want of water, but one tree existed on it, and there were not enough vegetables produced to supply the commandant's table; whereas now, through the introduction of vegetation, the water supply is excellent, and the garrison and ships visiting the island are supplied with abundance of vegetables of various kinds. Dr. Hooker states that it is proposed to cultivate in Ceylon and the West Indies the Calumba Root, introduced from the Mauritius, some eminent druggists having reported that the supply from East Africa is both scanty and bad, and that, owing to the condition of labour, etc. on the African coast, there is no prospect of an improvement.

ON THE NATURE OF THE ENTOZOOID ORGANISMS WHICH OCCUR IN ANIMALS AFFECTED WITH THE RINDERPEST.

A paper was published by Dr. Lionel S. Beale in the 'Medical Times and Gazette' for January 20, 1866, on certain Entozooid Organisms which occur very constantly in the voluntary muscular tissue of beasts affected with the rinderpest, and in that of the heart. Dr. Beale does not assert that these bodies are really animals, but contents himself with giving their history—for they have been observed for some years in various animals in an unhealthy or in an apparently healthy condition, and with describing their minute structure. Dr. Cobbold, who has devoted so much time and labour to the study of the creatures inhabiting the intestines of animals, is decidedly of opinion that the organisms of which we have just spoken are not animals, but is inclined to refer them to the vegetable kingdom, in the belief that they are sacs of *Psorospermiæ*, if these bodies are really Algæ, as Robin supposes. No true Alga, however, has ever been found in the tissues of animals, all the supposed species which have been described, including fish mildew, and its allies, being decidedly referable to Fungi.

We have already adverted to a notion which was put forth last autumn, of a possible connection between the cattle plague and the red rust which was so prevalent. Last autumn was however by no means exceptional, for we have frequently seen the grass as yellow with the rust-spots, and have heard conjectures as to the possibility of its causing cancer and other complaints to which stock of various kinds are subject. There is not, however, a particle of evidence to show that any of the truly parasitic leaf fungi are capable of establishing themselves in animal tissues. An anonymous correspondent in the same number of the 'Medical Times,' who styles himself a provincial physician, while hinting at the possible connection between rust and rinderpest, says distinctly that though the spores could be readily enough traced in the mucus of the air-passages of the dead animals, nothing further confirmatory of the notion could be elicited, or, in other words, there was no evidence of these bodies having germinated and penetrated the subjacent tissues.

There are, however, fungi which luxuriate in animal tissues, though they are not always confined to them. The fungi which attack the caterpillars of *Hepialus virescens* in New Zealand, and those of various moths and insects in other parts of the world, not excepting our own island, belonging to the curious tribe of *Sphæriacei*, are a familiar example of fungi addicted to the animal kingdom, specimens being often brought home from our southern colonies as curiosities. It is pretty certain that many of these attack the larvæ while living. But it is more especially different kinds of moulds which commit cruel ravages on living animals. The disease which is the scourge of silkworms arises from the attack of a very beautiful mould, *Botryosporium Bassianum*, which is probably identical with *B. diffusum*, a species extremely common on decayed stems of herbaceous plants, and there are several fungi of the same group which seem very indifferent as to their place of growth, and flourish on living animal tissues quite as readily as on decayed vegetables. We must not omit, moreover, the fungi to which some cutaneous diseases in man are due, or the fish-moulds which are the pests of the aquarium. Now it is very possible that the spores of any of these might be taken either into the lungs with the air we breathe, into the stomach with the water, or into the pores of the skin, and at length establish themselves in various parts of the body. The common occurrence of moulds in the urine, Sarcina in the stomach, and Penicillium in the air-passages, supplies instances familiar to every one who has paid the slightest attention to the subject. It is not therefore impossible that the organisms in question may really be a condition of some fungus, though from the numerous instances in which they have been found, where the rinderpest was not in question, there is no reason to believe that they are the cause of the disease, though they may be a consequence, from the diseased tissues affording a peculiarly favourable nidus for the development of the mould.

The ciliated surface, were it really shown that the processes are vibratile as those on the organs of some *Algæ*, would be opposed to this notion, but they may be only of the same nature as those which occur on the spores of some truffles, and other fungi. The walls of the sac should be tested to determine whether they are composed of cellulose, though this would not be absolutely decisive, as cellulose occurs in some undoubted animals, as for example in *Ascidia*. Dr. Beale has tried to obtain a further development, and it is very desirable that further attempts should be made in this direction, those specimens being chosen in which the bodies lie freely amongst the muscular fibres. It is curious, however, that at present, so far as the rinderpest is concerned, it is only in the striated fibres of the voluntary muscles and in those of the heart, which are similar in structure, that they have at present occurred, and not in the involuntary non-striated muscular tissue, whose position and structure would seem better calculated for their development. The matter is, however, in every point of view worthy of deep investigation, and it is quite as interesting to the botanist as to the zoologist, and demands the attention of all who regard either animal or vegetable pathology.—*The Gardeners' Chronicle and Agricultural Gazette.*

WHEAT PHOSPHATES.

The following is a communication from Dr. Tilbury Fox to the 'Medical Times and Gazette' of March 17th:—

Several years ago, I became aware that Dr. Hake had suggested to Messrs. Bullock and Reynolds the production of a preparation containing the organized chemical products residing in the outer layers of the wheat grain, believing that they probably would be found to possess peculiar nutritive qualities. In the year 1862, in a paper read before the Obstetrical Society of London, I drew particular attention to the good effects observed to follow from its use. During the last few years I have continued to prescribe the *wheat phosphates*, as the preparation is named, with great success, and feel so confident of its virtues that I strongly recommend it to the profession in general.

Whilst the subject of infants' food has, on account of prolific inventions and suggestions, become rather a bore, the tendency of refinement has been in the wrong direction, and very nice-looking products, pleasing to the eye, but useless for nutrition, have been obtained. The various forms of infants' food are in the great majority of instances simply and purely starch, the central portions of the cereals consisting entirely of the latter product; these foods do not deserve the name of, and *are not, flours;* to call them flours is nothing more or less than *fraud.* Now, inasmuch as the starchy element is not the assimilative nor the flesh-forming, but the heat and fat-producing principle, all our past efforts in securing a nice white flour have been antagonistic to the possession of nutritive material, and actually the very desirable part of the grain contained in the bran—viz. the organized phosphates and other principles, have been deliberately rejected. Seconds flour makes a much more wholesome bread than that of the first quality.

The importance of a due supply of phosphates in health and disease has been fully recognized at the present day, and as a result we now possess various pyro-, super-, and hypo-phosphates and -phites.

My experience teaches me that there is something essentially special in the organized phosphates—those, in fact, *which have been formed by passing through a living organism* (in nature's own laboratory)—as compared with artificially prepared phosphates. It is not the amount, but the kind exhibited that produces the good result. No simple mixture is in any way a substitute. It is not at all unlikely that the cerealin, of which little is known, but which is associated with the phosphates in the bran, and has an action similar to pepsin, may conduce to the beneficial result. A similar kind of action is observed in those cases where quinine fails, but decoction of bark instantly succeeds. The organized phosphates I speak of aid the assimilative function, and I find that ordinary foods are digested, and even medicines—for example, iron when given in combination—act most efficiently after they have previously failed alone. The same is the case with ordinary food in weak digestions. Many of the "foods" recommended are really animal in character—such are the extracts of meat. Nature distinctly points to the agent now under notice as a preferable aid, in virtue of its vegetable origin. The wheat phosphates, too, contain the desirable properties of brown bread without the objectionable ones, viz. the cuticle and husk.

The mode of preparation is simply to make a decoction of well-selected bran, carefully evaporate in a water bath, mix the residue with sugar, and reduce to powder. It may be used in the place of sugar, a teaspoonful or less being added two or three times a day to the child's food. The cases in which its use is chiefly indicated are those amongst the young, in whom the assimilative function is at fault. I can speak very strongly in cases which belong to my own particular speciality—diseases of the skin. Eruptive diseases of the scalp in infants are most frequently associated with faulty assimilation. Here the wheat phosphates act marvellously well. But in rickets, in marasmus, chronic diarrhœa, and impaired nutrition of all kinds, I believe them to be most invaluable adjuncts. Pallid children pick up tone, colour, and flesh; worms disappear; intestinal irritation subsides; the secretions become healthy; and disease goes. I lay great stress on the phosphates under notice, in their character as *organized products*, as greatly helping assimilation of food and medicinal agents, and believe them to be the most preferable form of phosphates, especially for the young.

TRADE IMPOSITION.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—On calling upon a friend in the trade this morning, I found him in a state of great excitement, through his discovery of being the victim of a gross imposition. His chagrin was the more as he considers himself rather a sharp man, and is generally too wary to be caught in such meshes.

The case is this. A very respectable commercial traveller called upon him, and in the course of other business transactions, stated he had obtained the agency for a spirit house in Yorkshire, and that he was in a position to offer spirit of wine of great purity at 10*s.* 6*d.* per gallon, and that it was sufficiently sweet and good to make lavender water, and indeed good enough for all purposes of the trade, making tinctures, etc. My friend, having great confidence in the traveller, and the price being so tempting, ordered a twelve-gallon tin of it, and finds it to be nothing more than cleaned methylated spirit of wine, which answers the test for sp. ætheris nitrosi—it evidently has been cleaned through the agency of nitric acid.

Hoping this letter will prevent others in the trade from being *sold* through their *buying* this article, which is certainly not worth more than 4*s.* to 5*s.* per gallon,

I am, Sir, yours respectfully,

Birmingham, March 24, 1866. T. Barclay.

THE METRIC SYSTEM.

A conference, called by the Metric Committee of the British Association for the Advancement of Science, and the Council of the International Decimal Association, was held last evening in the Geological Museum, Jermyn Street, to discuss "the introduction of the metric system of measures and weights into the course of scholastic instruction in this country." Sir John Bowring, who presided, said there had been many discussions with reference to the decimal and metric questions, and as regarded our accountancy and currency the decimal system was recognised by the introduction of the florin. The necessity of applying in all countries the same system of weights and measures was every year acquiring new importance, and there was a growing impression amongst intelligent people that if a system were universally recognised and applied, it would not only be of great advantage to education, but it would strengthen those bonds of brotherhood which the emancipated commerce of the world was forming. A letter, apologising for inability to be present, was read from Professor Huxley, who wrote:—"It has long appeared to me to be a matter of great importance that English zoologists and anatomists should adopt the same system of measures as that used by their foreign brethren." Mr. James Yates, M.A., then explained the use of an apparatus he had invented, to teach the metric system in schools. It consisted of six instruments, and the lecturer maintained that any intelligent boy or girl could understand the principles involved in a quarter of an hour. The Chairman, to illustrate the beauty and simplicity of the decimal system, said he had seen it recognised among savage nations, and had never known a Chinese or Japanese boy make a mistake in accounts, because he used an abacus which God had given to every one, namely the fingers. Mr. W. Ewart, M.P., said the English were slow in this, as in other matters, because they hated a theory. The decimal system had made way in many other portions of the world, while it was comparatively unknown in this country. The present House of Commons were favourable to the system. The Ministry were introducing a Weights and Measures Bill, and he had given notice of an amendment, with the view of getting a compulsory adoption of the metric system for a given number of years. The Liverpool Chamber of Commerce were petitioning the Legislature in favour of a decimal system; and the American people were willing to join us in adopting it. Mr. D'Eyncourt, from his personal observation in France, said he felt convinced the decimal system would have to be adopted as trade increased between England and France; that its adoption would bring about a great saving of expense, time, and trouble, and ensure more perfect calculations; and that if lectures were given every day for a fortnight, the Custom-house clerks would be able to keep the accounts of the country on the decimal system. The discussion was continued by several gentlemen, including Mr. Fitch, M.A., and Professor Leone Levi. The meeting passed a resolution approving of the metric system, and remarking that it was desirable the Committee of Council on Education should introduce questions on the metric system into the examinations of candidates for school teacherships. A vote of thanks to the chairman was given at the close of the meeting.

ACCIDENTAL POISONING BY ACONITE.—THE CHARGE AGAINST MR. NOAKES.

This case, the proceedings of which, before the magistrates, were reported in our number for October last, was tried at Lewes, on Wednesday, March 21, before Chief Justice Erle, who, in his charge to the Grand Jury, thus referred to the case:—

"There is a charge of manslaughter against a chemist, who appears to have sent aconite to the deceased at a time when the deceased expected henbane to be sent to him. In respect to that bill I commend it to your careful notice, because, as I read the depositions, I think that the charge is not made out against the accused. You are well aware that the essence of the charge of manslaughter is, that death should have been caused by the unlawful act of the accused; and I think it is doubtful to my mind whether there is evidence on which I could act if I was on a jury,—that is, whether death was caused by the act of the accused. There is, to my mind, so much doubt, that if I was on the jury I could not say the act of the accused was an unlawful act. The accused appears to be a chemist very much relied upon by deceased, Mr. Boys. He had been in the habit of having medicine from him; he was eighty years old, and had a complaint,—a dangerous complaint, bringing him approximately to the brink of death at all times,—that was a complaint of the heart. He had been in the habit of receiving from the defendant a medicine called henbane and a medicine called aconite for the disease he had; and he had a peculiarity of being determined to have his medicine supplied to him in his own bottles which he chose to send. The bottle which was used for aconite had been an *eau de Cologne* bottle, and was marked 'Poison—Aconite' outside; and the bottle he chose to send for henbane was a common bottle, marked on the outside 'Poison,'—poison only. His disease of the heart was bringing him so approximately to death, that his wife states that they made it a point on no occasion to interfere with the will of deceased. He was a man of great intelligence and very firm decision, and having a diseased heart whatever he chose to think was done without resistance. A few days before his death he sent the bottle intended for henbane with a bottle intended for some liniment. He sent both bottles wrapped up, and with a verbal message to the chemist, 'please to fill them and to return them to Mr. Boys.' There was no prescription, no written instructions; and the accused was in the habit of sending both henbane and aconite to him. Upon this occasion he put aconite into the bottle intended for henbane. Deceased shortly afterwards took thirty drops of aconite, and perhaps,—perhaps that quantity of aconite did bring on some accelerated action of the heart and so caused death. But I should be of opinion that if Mr. Boys had lived and brought an action against Mr. Noakes for damage done to him by his sending aconite instead of henbane, that under these circumstances Mr. Boys was really as responsible as Mr. Noakes, for that which had happened. He chose to have bottles of his own, he chose to send them without written instructions, he chose to be on these terms that nobody could say a word to him; he had been in the habit of having both henbane and aconite from Mr. Noakes, and one bottle was filled with aconite instead of henbane, and of this he took a dose rather larger than was conducive to health. The evidence of the medical men as to the cause of the death of Mr. Boys shows clearly that death arose from disease of the heart, from which he had long been suffering; and at the *post mortem* examination it was found that the state of the heart was clearly such as would lead to death. The diseased heart had caused death. But other medical opinions have come in, and the supposition is that the taking of the aconite, perceived in the course of the night, did accelerate the action of the heart, and any acceleration of the heart might hasten death. Probably you are aware that a man is responsible if he hastens the moment of death by the smallest degree; but the utmost that is said by the second medical man is that he inclines to the opinion that perhaps death was accelerated by taking aconite instead of henbane. The accused appears to have been a chemist of the highest respectability and the greatest caution, and the widow of deceased states that it is not at all by her desire that any proceeding should be taken. Probably it would be a matter of great importance to the accused if you did carefully examine whether that bill ought to be thrown out. It rests entirely with you. It is of great importance that chemists dealing with such powerful instruments as drugs should exercise due care and caution; but cases are to be judged by circumstances, and therefore I say the circumstances of this case are worthy of your attention on the grounds I have mentioned."

Notwithstanding the manner in which the learned judge had placed the case before them, the Grand Jury brought in a true bill against Richard Noakes for feloniously and wilfully causing to be taken, by Samuel Boys, a certain deadly poison called aconite, and thereby slaying the said Samuel Boys, on the 21st of August, 1865.

Mr. Besley conducted the case for the prosecution; Mr. Roupell and Mr. Merrifield appeared for the defence.

The death had been caused by the administration of aconite by mistake, and it excited some interest.

The prosecution, it was stated, had not been instituted by the relatives of the deceased, but by the public authorities, who considered that a trial ought to take place. Mr. Boys, the deceased, was an old gentleman of the age of eighty, who resided at Lansdown Terrace, Brighton, and suffered from disease of the heart. He had been attended by a Dr. Dill, who had prescribed for him thirty drops of henbane, to be taken occasionally, with a view to his relief. The deceased kept the drugs he used in a medicine-chest, in his own bottles, and among those he took were henbane and aconite. The prisoner (who is about sixty years old) was stated by the counsel for the prosecution to be a most respectable chemist, and he, from time to time, supplied Mr. Boys with drugs and medicines, and, among other things, for years with aconite, and on one or two occasions with henbane. The last day he supplied any drugs was on the 16th of August, when two bottles were taken by Mrs. Boys to his shop "to be filled," one of them being labelled "Henbane, thirty drops," and the other was labelled with the name of a medical oil which was required as a liniment, "for outward application only," and the bottle had those words also on it, but in smaller letters. It was admitted that on this occasion the prisoner himself had filled the bottles, which were sent to the house of the deceased, and given to his servant; and there was no doubt that they found their way to the medicine-chest of Mr. Boys. On the night of Sunday, the 20th of August, he felt an attack of his disorder, and said he would take a dose of the henbane, which he then accordingly did take, measuring it out himself in a "drop-glass," as it is called, which measures the number of drops. The dose, it will be borne in mind, was thirty drops (which was written on the outside of the bottle), and there was no reason to believe that it had been exceeded. Upon swallowing it, however, he observed that it "felt hot," which, it appears, is a symptom of aconite. About a quarter of an hour afterwards he said his limbs had become benumbed—which also, it is stated, is a symptom of aconite. After this he felt sickness, which, again, is a symptom of that deadly poison. He became alarmed, and looked at the bottle, having a suspicion that there was some mistake; but on looking at it and seeing it marked "henbane," he said, "It's all right." He was extremely ill all night, and early in the morning desired that the bottle should be sent to Mr. Noakes to see if it was right, retaining, however, a portion of it in the house. Not long afterwards he became drowsy, and in the course of the hour he died. The attention of the medical men was directed to the contents of the bottle in question, and they were satisfied from its pungent taste that it was aconite. A *post mortem* examination, however, disclosed the seat of the cause of death was the heart, and it appeared that aconite acts on the heart, and is especially dangerous when the heart is diseased.

The case for the prosecution was that aconite was contained in the bottle, and there is no doubt that it is a deadly poison, so that 30 drops would be certain to cause death. The liquid in the bottle had been analysed, and found to be tincture of aconite, of which ten drops would be sufficient to cause death. The case for the prosecution was that Mr. Noakes had been guilty of criminal negligence in putting aconite into the bottle instead of henbane. It was suggested that the mistake had arisen in this way:—Two bottles had been sent by the deceased to be refilled, one with a liniment, the other with henbane. Now, on former occasions aconite had been sent for as a liniment, and it was suggested that on this occasion, supposing that the liniment wanted was aconite, he had sent aconite, and had, moreover, put it into the bottle which ought to have contained the henbane, putting the henbane into the bottle which was meant for the liniment, and which was marked "for outward application only," in consequence of which the deceased took the aconite instead of the henbane, taking it out of the bottle which ought to have contained it, and which was marked with a label—"Tincture of henbane, 30 drops at a time." The two mixtures appeared to be somewhat of the same general kind of colour, especially at candle light, and so they could only be distinguished to the eye by the labels upon the bottles, although there are differences of colour, taste, and smell. On the other hand, the two bottles were of very different size and shape, the smaller one, which ought to have contained the aconite, being only about a quarter of the size of the other. This was the main circumstance relied upon by the prosecution as proof of culpable carelessness; but, on the other hand, it was stated by the assistant that the bottle marked for henbane was not one which had been originally sent out from the defendant's shop, or would have been sent for such a purpose; and although it might have been backwards and forwards to the shop for henbane, it might or might not have been seen by the defendant before. It bore upon it, however, it will be observed, a label distinctly indicating that it was intended to contain "tincture of henbane." It came out that the deceased was also in the habit of sending for aconite, but in a smaller bottle marked "Poison; for outward application only," and this, again, was quite a different form of bottle from that sent for the liniment on this occasion, being a round bottle, whereas the bottle sent for liniment on the present occasion was square. The main ground of defence suggested on cross-examination was that the unfortunate deceased had sent bottles different in form and shape from those which the prisoner himself was accustomed to use for the respective drugs supplied (both being white), and that this had misled him. It was stated that he was very careful in using a totally different sort of bottle for outward applications—a bottle made of glass, blue in colour, and fluted in structure, so as to be easily distinguishable either by the eye or the touch in any light, or in the dark in case it was used at night. Now, it was urged that but for the strict orders of the deceased to send the tinctures in his own bottles, this blue fluted bottle would have been used on this occasion to contain the aconite, and would thus have been easily distinguishable in any light. The last time aconite was supplied to the deceased by the prisoner was in April; the particular occasion now in question was in August; and a bottle was produced in which it was probably supplied bearing the prisoner's name, and labelled "aconite, for outward application," and this was, on the one hand, of white and smooth glass, and so quite different from the bottles used by the prisoner for such mixtures, and, on the other hand, being round instead of flat in form, and being much smaller than the large flat bottle sent for the liniment, was quite different and easily distinguishable therefrom. And upon this fact, as already mentioned, the case for the prosecution mainly rested.

Dr. Phillips, the medical man who was called in and made the *post mortem* examination, stated that aconite paralysed the heart; that thirty drops would fatally paralyse it and cause death; and that the death here was owing to paralysis of the heart, or stoppage of its action. It was stated that the prisoner, when he was applied to and shown the bottles, appeared to perceive that he had made an unfortunate mistake, took all the blame upon himself, and showed great distress of mind—indeed, he very nearly fainted. It was stated that for thirty years he had dispensed medicines, and that no complaint or accident had been heard of before; and his general repute was that of a most able and careful practitioner. It was elicited from the medical witness that if he had not heard anything about aconite, the state of the heart itself was quite sufficient to account for death, its disease being such that death might occur at any moment; and the examination having been directed chiefly to the heart alone as the seat of the actual cause of death actual traces of the presence of aconite in the system (which, it appears, it is difficult to discover) were not detected; and the defence was partly grounded upon the doubt as to the actual cause of death being the aconite or the disease; and the medical witness being pressed as to whether he could positively say that the aconite had anything to do with the death, he stated that he could not positively say that it had, though the appearances of the heart were such as would result from aconite. It was also endeavoured to make out that aconite is sometimes given internally in cases of disease of the heart, and though the medical witness for the prosecution himself deemed it dangerous, he admitted that other medical men thought otherwise, and also that there was great variation as to the strength of the doses given. As a matter of fact, the medical witness stated that chemists did not go by the 'British Pharmacopœia,' although they ought, he said, to do so. However, the medical witness, in conclusion, stated positively that a man labouring under disease of the heart could not take thirty drops of aconite with impunity. Dr. Schweitzer, an analytical chemist, also proved that the bottle sent by the prisoner marked "henbane," contained "strong tincture of aconite," and stated that from three to fifteen drops of it would be a proper dose, and fifteen drops a strong dose, even supposing it a fit medicine at all in a case of disease of the heart. He, however, said that he was a "chemist," and not a medical man. Dr. Harris, the medical man who had long attended the deceased, stated it as his opinion that the aconite was not the cause of death. This was the case for the prosecution.

The Lord Chief Justice thereupon put it to the jury whether they deemed it a case in which they could call upon the prisoner for his defence, or whether they would not rather say that it was a case in which they were not sufficiently strong or clear to warrant them in finding a party guilty of felony. They could not commit in such a case unless clearly and firmly satisfied that there had been a culpable degree of negligence, and that it had caused death. Now, as to the first point, there was no judge who would go further than he would in demanding from a chemist a great degree of care in sending out the powerful and dangerous drugs in which he dealt. But this was the case of a chemist put out of his ordinary course and not allowed by his customer to use his ordinary precautions, but desired to send the medicines in bottles which the customer chose to send for them. Moreover, it was the case of a chemist whose customer had dealt with him for several years in aconite, and had only sent once or twice for henbane. No doubt the bottle in which the aconite was sent had upon it a label bearing on it the word "henbane," and then, in smaller letters, "thirty drops," and it might be said that the prisoner ought to have read those words. But without saying that there might not have been evidence in a civil action, he should certainly pause before he concurred in a conviction for felony on that ground. Then, as to the second point—the cause of death—the jury must be satisfied, before they convicted, that the death was caused by the alleged negligence. But one of the medical witnesses for the prosecution stated that he could not say that the aconite had anything to do with the death (though it might have accelerated it); the other stated that it had not. Under these circumstances, could the jury safely convict of felony?

The jury, after a few moments' consultation, returned a verdict of *Not Guilty*, which was received with some applause.

THE DETECTION OF BLOOD-STAINS BY THE MICRO-SPECTROSCOPE.

The trial of Robert Coe for the murder of John Davies, at Aberdare, is remarkable as the first case in which the micro-spectroscope has been employed to furnish evidence of the presence of blood-stains. The following is Dr. Herapath's evidence:—

Dr. Bird Herapath sworn: "I am a Fellow of the Royal Societies of London and Edinburgh. I practise as an analytical chemist and also physician. The hatchet produced was given me by Mr. Wrenn, and I carefully examined it. On the metallic portion I did not find any marks upon which I could rely. I removed the handle and experimented on thin slices of wood which I took from underneath the metallic ring. I examined those sections with a microscope, and found the majority of the stains were due to oxide of iron; some of them showed clotted blood; in some cases the woody portions had been infiltrated with the colouring matter of blood changed by the action of water. On some of the sections of the handle I found globules of blood, and by the micrometer I measured the size of those globules. I placed a section of the handle in a glass cell in which there was a fluid medium, and the blood-globules floated off into the cell, and by the measurement of these I could determine the size of the globules therein.

contained. These globules were exactly the same size as some globules from dried human blood which I purposely procured, and tested with the same apparatus in the same way. Finding this evidence of blood to be small, I obtained more numerous sections of the coloured surface of the handle of the hatchet, immersed them in distilled water, and obtained thereby a slightly coloured solution, which after filtering was ready for chemical tests, and for optical examination by the micro-spectroscope. I subjected this fluid to the action of light, and it had undoubtedly the properties peculiar to a solution of blood. When a solution of blood was examined in this instrument (instrument here produced) the fluid absorbed some of the rays of light, and thus altered the spectrum or rainbow. Within the green, and on the border of the yellow rays two dark absorption bands were produced by the blood fluid. Only one other substance would produce two dark bands—that is cochineal dissolved in ammonia, but the position of the two bands was different. The spectroscope alone would not enable me to *readily* distinguish between the two, but combined with chemical examination it would satisfactorily do so. From this optical test I was satisfied that the sections of the hatchet had been stained with blood, and by chemical analysis I also demonstrated it was blood. The combination of the three tests showed that the substance on the hachet must have been blood."

Cross-examined: I should not like to say that the stains were those of human blood, but my opinion is that they were.

POISONING BY ARSENIC AND STRYCHNIA.

At the Exeter Assizes, March 15th, before Mr. Justice Byles, Mary Ann Ashford was indicted for the wilful murder of William Ashford at Honiton Clist, on the 4th of November.

Mr. Kingdon and Mr. Slade were counsel for the prosecution; Mr. Coleridge, Q.C., and Mr. Cox defended the prisoner.

It appeared that the deceased, who was the husband of the prisoner, was a shoemaker, carrying on a good business at Honiton Clist, a village about four miles from Exeter. He was a very industrious, thriving man, and had saved about £250. The husband and wife were about the same age,—between forty and fifty,—and had been married about twenty years, and had lived a happy married life until the last two years. The first part of the case was that on Sunday, the 29th of October, the prisoner complained to a neighbour that her husband was ill—that he was suffering from diarrhœa and sickness. On Monday nothing particular occurred, but on Tuesday, the 31st of October, the prisoner went to Exeter and saw a medical man, Dr. Roberts, to whom she described her husband's state. On Wednesday morning, the 1st of November, Dr. Roberts received a message from the prisoner, requesting him to come and see her husband. Dr. Roberts accordingly went to the house and saw deceased. He found him much prostrated, and very weak and ill—constantly sick and complaining of great pain and thirst. He changed the medicine he had before sent him. Dr. Roberts called again the next day, the 2nd of November, and found the symptoms still continuing. He again changed the medicine. On Friday he saw him again, and he then requested Dr. Miles to come and see the deceased man. On Friday night the deceased was attacked with fits and suffered great pain, the back being bent back, and the limbs drawn up. On Saturday morning the poor man died.

The next question was the cause of the death. An application was made to the coroner, and there was a *post-mortem* examination. Two medical men who examined the body could not discover any natural causes to account for the death. Grave suspicions were entertained, and the stomach, liver, and various parts of the vomit were placed in jars, sealed up, and taken to Mr. Herapath, at Bristol, who discovered arsenic and strychnine in them. The symptoms were consistent with death occasioned by these poisons.

The question then arises, by whom were these poisons administered? The prisoner had been the only person in attendance on the deceased. On Wednesday, the 25th of October, the prisoner had sent a little girl to a chemist for some jalap. On Sunday, the 29th of October, she complained of her husband's illness. No one then saw deceased until Tuesday evening, October 31, when Mrs. Butt, a neighbour, went in to see him, and the prisoner asked her to stay a little. On Thursday evening, November 2, a Mrs. Brewer was called in by the prisoner, and she continued there all night. The prisoner mixed up some medicine in the kitchen, and took it upstairs to him. On Friday evening, November 3, the deceased was desirous of having some tea. The prisoner went downstairs to get some, and she brought up a teapot and teacup which had some milk in it. There was a knock at the door, and the prisoner went downstairs. Mrs. Butt, who was in the bedroom, went to pour out some tea, but upon lifting the spoon, she found a bluish-white powder attached to it. She gave the deceased the tea, but it was offensive to him, and he would only take the smallest quantity of it. That powder must have been put into the cup by the prisoner while downstairs. On the Saturday, November 4, Mrs. Butt went into the bedroom, and upon the washstand she saw a wineglass, and there was a white-blue powder settled at the bottom of the glass. Mrs. Butt took the powder and put it in a paper, and that was sent to Mr. Herapath, who discovered it to be arsenic. After the man was dead suspicion became very rife, and the prisoner was taken into custody. She was about to be searched when she took out of her pocket a prayer-book, a purse, a pocket-handkerchief, and a small packet, which she instantly threw into the fire. She spilt some part of the powder contained in the packet on her clothes, which she wiped off with her pocket-handkerchief,—that was found to be arsenic. Under the clasp of the purse there was a white powder, and that was found to be strychnine mixed in starch. On the 10th of November, when Mrs. Brewer was cleaning the house, she found in the bedroom a packet screwed up, and that packet was labelled "poison." Poison, therefore, was found in the body; poison was found in the teacup and in the wineglass. No one could have administered the poison but the prisoner. It was shown that the prisoner had thrown the packet which was in her pocket into the fire, and that this packet contained poison. Then came the question of motive. It appeared that the man and wife had lived happily together for nearly twenty years, but that there had been an estrangement for the last two years. It has been stated that the deceased was a shoemaker; he had in his employment an apprentice and a journeyman named William Pratt, and there was no doubt but an illicit intercourse had been carried on between the prisoner and Pratt. This had excited the notice of the husband, and he had discharged Pratt, who then went to live at Dawlish, and a long correspondence had taken place between Pratt and the prisoner, showing the nature of the connection which had existed between them. The deceased had some time since made a will, in which he had given most of his property away from his wife. She was very angry at this, and in June last he executed another will, by which he left all his property to the prisoner. It would seem that after Pratt left the deceased he became cold to the prisoner, and she was desirous of regaining his attentions to her.

This was the case for the prosecution, and was proved by the witnesses named in the statement of facts.

Mr. Kingdon summed up the evidence that he had adduced on the part of the prosecution.

Mr. Coleridge then addressed the jury on behalf of the prisoner in a most affecting speech.

The learned Judge having summed up,

The jury conferred for ten minutes, and then returned a verdict of guilty, and sentence of death was passed, without hope of mercy.

POISONING BY "WHITE PRECIPITATE."

At Manchester, March 15th, before Mr. Justice Lush:—Ruth Hargreaves, a girl aged eighteen, was charged with having at Newchurch, on the 9th of December last, and on divers other days, feloniously administered or caused to be taken by Henry Hargreaves, her father, a certain poison called "white precipitate," with intent to kill and murder him.

Mr. Torr prosecuted; the prisoner was undefended.

It appeared that the prisoner, who is a mill-girl, had formed the acquaintance of one

Henry Heap, with whom she kept company, and whom she was in the habit of meeting when out. This acquaintance her father and mother endeavoured to stop. The girl's father being ill was attended by a medical man, who sent him a bottle of medicine, and the father of the girl on taking a dose of this experienced a burning sensation in the throat and stomach, and became very ill. He was also fond of buttermilk, and on partaking of some which was in a jug in the house, the same symptoms were again produced. In consequence, he had the medicine and buttermilk sent to his doctor, who found in each traces of white precipitate, and on the buttermilk being sent to Mr. Calvert, the analytical chemist, he found ten grains of white precipitate in it. This was described by the doctor as a virulent poison, and by Mr. Calvert as a noxious drug, not certain as a poison, but calculated to produce chronic inflammation of the bowels if taken in small doses. If taken in large doses it would produce vomiting and be rejected. It appeared that the prisoner had sent a little girl to a druggist's for "white precipitate" to cure ringworm. On being taken into custody she stated that she had put it into her father's medicine and milk to make him worse in his illness, so that she might be able to get out more to meet her sweetheart. In her defence she said she had done it at the instigation of Henry Heap, and that she never intended to kill her father, but only to make him ill.

His Lordship directed the jury that the evidence rather pointed to the misdemeanour of administering a noxious drug with intent to injure, than to the felony; and

The jury found the prisoner guilty of the latter offence.

His Lordship sentenced her to twelve months' imprisonment with hard labour.

ATTEMPTED SUICIDE WITH STRYCHNIA.

The following case is reported by Dr. Tracy E. Waller, Philadelphia, in the Phil. Med. Reporter.

In the afternoon of Sept. —th, Dr. —— went into one of the most respectable and popular drug stores in the city, and wrote the following prescription, and giving it to one of the principal clerks, waited for it to be put up, which was done in a few minutes. ℞ Strychniæ gr. iv.; Sacch. alb. ʒj. M.

He told the druggist that he would divide it into the proper doses himself when he got home, and so had it put into a phial and labelled in accordance with the prescription. There was nothing in the doctor's manner or appearance to indicate anything wrong in his purpose, and the gentlemanly and intelligent druggist had no idea but that it was all right to give him the poison in bulk. During that afternoon and evening he took several drinks of whisky, and wrote letters to different persons respecting his suicidal act. About 11 o'clock, he went to his room, laid the letters on the table, so that they might be seen by others, and then took a tumbler with about half a gill of water, and poured the poison-dose into it, adding a large drink of whisky, and stirring it with a teaspoon until the medicine was all dissolved. He then swallowed the whole of it, and in five or six minutes after took another drink of whisky. In the course of twenty minutes the effects became manifest, but not as he expected, as it was his intention, when he first thought of committing suicide, and started to the drug store to get the deadly article, to take *morphia*. But ere long after swallowing the fearful potation, he was convinced that he had taken *strychnia*, and knew what horrible sufferings would be the result before death could take place. The terrible spasms of the muscular system, the lightning-like jerks of the limbs, the "throat-latch grip," strangulation, and all the horrible phenomena attending a fatal dose of this medicine, are well known to medical men generally, and I will only remark on this point, that the doctor went through the whole catalogue of the horrors and sufferings of a living death, and during the latter part of the night it seemed impossible that he could live. He was finally relieved by chloroform and morphia in solution, but the muscular spasms did not entirely cease until the afternoon of the next day, and the lameness or stiffness of the limbs and neck, and consequent debility of such an experience as he went through continued for several days. During all the long hours of his unspeakable suffering, through that night and the next day, and when it seemed impossible that he could live through another spasmodic shock, his mind was perfectly clear, and he was entirely resigned to his fate.

The people in the house became alarmed soon after the distressing symptoms of the poison were developed, and physicians were sent for, but none arrived until near three hours after he swallowed the dose. It therefore had every advantage of its destructive powers upon his life. Three weeks have passed, and he is now entirely well. Had the *whisky* he drank any influence in preventing a fatal result?

I can vouch for the facts as here stated, and will leave the subject for such remarks as you may think proper to make. I have been looking over Christison and Taylor on poisons, and they have records of fatal cases from much smaller doses than the doctor took.

Obituary.

WILLIAM SOUTHALL, OF BIRMINGHAM.

We have to record this month the decease of one of the older members of the Society, Mr. William Southall, of Birmingham, who died on the 16th of March, in the sixty-ninth year of his age.

He first commenced business in 1820, at Leominster, the place of his birth, where he succeeded to the business established by his brother Thomas, who had removed to Birmingham; but in 1832 he joined him there, and they continued in partnership until the decease of the former in the year 1861.

He felt much interest in the establishment and growth of the Pharmaceutical Society, of which he was one of the founders and a member of the Council for some years.

He was always ready to take part in any movement for the benefit of his pharmaceutical brethren, but for the few last years of his life was precluded, by the state of his health, from much active exertion, being confined to his chamber for about seven months previous to his death.

He endeavoured at all times to uphold the status of his profession, and leaves behind him a name which we believe will be remembered with respect by those who knew him.

MISCELLANEA.

Poisoning by Castor Seeds.—On Saturday evening, March 17th, Mr. Joshua Allen, residing at 9, Bath Street, Poplar, was suddenly seized with violent vomiting and purging, accompanied with burning pain in the gullet and stomach, with all the symptoms of Asiatic cholera. Dr. G. C. Kernot, surgeon, of Crisp Street, Poplar, was immediately sent for, and found him suffering from an irritating poison. Upon inquiries, he found he had been persuaded, by a man in the docks, to eat a few castor-oil seeds, which at once revealed the cause of the illness. The unfortunate man lies in a very lamentable condition; his recovery is extremely doubtful.

Accidental Poisoning by Cyanide of Potassium.—On Wednesday, March 7th, an inquest was held in the Albany Road, Camberwell, on Mr. Cross, aged forty, a photographer. Deceased complained of being unwell, and was afterwards found insensible. A doctor was sent for, but consciousness could not be restored; and in a short time death ensued. It appeared from the vomit of the deceased that he had taken some cyanide of potassium, which had caused death, it transpiring from the evidence that the poison was probably taken in mistake.—The jury returned a verdict of "Accidentally poisoned by cyanide of potassium in mistake for ammonia."

Poisoning by Morphia.—On Tuesday, January 23rd, an inquest was held at Tottenham, on the body of Mrs. Harriet Bowker, aged fifty-three, who died on the 26th December, and it was alleged that a few days before her death she had been ill-used by her husband. A *post-mortem* examination of the body showed some injuries, but it was thought desirable that an analysis of the contents of the stomach should be made. Dr. Letheby, who made the analysis said, that morphia was found in large quantity, and other medical evidence was given to the effect that death had resulted from taking that drug. The husband was called, who denied ever ill-using his wife; he said, she was addicted to taking morphia. The verdict returned was, that deceased died from taking an overdose of morphia, which she was in the habit of taking to lull pain.

Adulterated Limejuice.—On Tuesday evening, February 27, Mr. C. J. Carttar, coroner for Kent, resumed and concluded, at the Beehive Tavern, Bridge Street, Greenwich, an inquiry relative to the death from scurvy of Henry Griffiths, one of the crew of the 'St. Andrew's Castle.' Samples of the limejuice supplied to the ship were handed round to the jury, and practical men pronounced it to be of good quality. Several of the crew were now examined, and they spoke well of the provisions on board, which were above the average quality. With respect to the limejuice, they stated it was excellent, and better by far than that usually served out on board ships. Dr. Henry Leach, medical officer on board the 'Dreadnought,' said that the cases of scurvy brought under his care on the 16th ult. from on board the 'St. Andrew's Castle' were the worst he had ever seen. The man Griffiths died the next day. He had analysed some of the so-called limejuice from on board that ship. He was assisted by a chemist of high standing. They found that the fluid was not limejuice at all. It was either citric acid and water or weak lemonjuice and water, but they believed that it was merely citric acid and water. The mixture was quite inert and useless as an anti-scorbutic. If mariners had good limejuice on board ship, and if it were taken regularly, 80 per cent. of the cases of scurvy which occurred would never take place. The jury returned a verdict—"That the deceased died from scurvy; and the jury further say that the juice shipped on board the 'St. Andrew's Castle' was a chemical decoction perfectly useless as a preventive of scurvy." The coroner said the case of this ship would be brought under the notice of the House of Commons.

A Flock of Sheep Poisoned.—The 'South-Eastern Gazette' records the following case of a number of sheep being poisoned from eating a shrub known as *Andromeda floribunda*, brought from North America. It appears that a short time ago the gates leading into the pleasure-grounds of Mrs. Deacon, of Mapledon, were left open, and thirty-eight sheep, which were grazing in a meadow near, strayed into the pleasure-grounds, and while there ate of this shrub. Mr. Hewitt, the bailiff to Mrs. Deacon, at once treated the sheep, thirty-seven of which showed symptoms of poisoning, and then called on Dr. Gregory, and under their united treatment nineteen of them recovered.

Alleged Death from Opium.—An inquiry has been held at South Stockton, before J. C. Sowerby, Esq., respecting the death of an infant, aged three months, who, it was said, had died from the effects of an overdose of opium. It appeared from the evidence that the child suffered from bronchitis, and had been attended by Mr. Laidler, surgeon, but subsequently had been seen by Mr. Dixon, assistant to Dr. Farquharson, who prescribed a mixture and some powders; a dose of the mixture was given by the mother, and then one of the powders, two or three hours after which the child was convulsed, and died the next day. A *post mortem* examination was made by Mr. E. H. Trotter, surgeon, from which it appeared that death was caused by congestion of the brain. The Coroner said that as no analysis of the remaining medicine and powders had been made, there was no evidence to show the exact quantity of opium they contained. The jury, after consulting together, came to the following decision:—"The jury are of opinion that deceased died by congestion of the brain, but whether it has been caused by bronchitis or is the result of an overdose of opium, there is no evidence to show." Dr. Farquharson thanked the jury for giving Mr. Dixon the benefit of the doubt.

Prohibition of the use of the Polish Language by Chemists in Russia.—The 'Invalide Russe,' of the 21st of December, publishes a circular from General Bezak, the Governor-General of Kieff, to the commanders of districts, in which it is stated that it has come to his knowledge that in some districts in his Government the books and accounts of chemists are kept in the Polish language, and that physicians, even those who are in the service of the State, use the Polish language in their prescriptions, for the addresses of their patients, and the directions for applying remedies. The circular then instructs the local commanders to give notice to all chemists and dispensers of medicine that their accounts and books must be kept in the Russian language, and that the tickets placed upon their phials and boxes must exclusively be made out in that language under a penalty of 50 roubles for the first violation of the order, 100 roubles for the second, and complete suppression of the business for the third. Physicians are to be warned that they must not write their prescriptions in any other language than Russian or Latin, under penalty of a fine of ten roubles for each prescription in Polish, and physicians in the service of the State will in addition be deprived of their appointments.

BOOKS RECEIVED.

On the Nature, Cause, and Treatment of Tuberculosis. By Horace Dobell, M.D., etc. London: John Churchill and Sons, New Burlington Street. 1866.

The Active Medicinal Principles of Cod-Liver, Determined and Separated. By C. C. Guffroy. London: Robert Hardwicke, 192, Piccadilly. 1866.

The Year-Book of Pharmacy: a Practical Summary of Researches in Pharmacy, Materia Medica, and Pharmaceutical Chemistry during the year 1865. Edited by Charles H. Wood, F.C.S., and Charles Sharp. London: John Churchill and Sons, New Burlington Street.

On Inhalation, as a means of Local Treatment of the Organs of Respiration, by Atomized Fluids and Gases. By Hermann Beigel, M.D., etc. With woodcuts. London: Robert Hardwicke, 192, Piccadilly. 1866.

The Alkaline Permanganates, and their Medicinal Uses. By John Muter. London: John Churchill, New Burlington Street. 1866.

TO CORRESPONDENTS.

Persons having seceded from this Society may be restored to their former status on payment of arrears of subscription and the registration fee of 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.

G. H.—'Tomes's Manual of Dental Surgery,' Churchill.

A Student.—A knowledge both of the *British* and of the London Pharmacopœias is required.

G. R. D. (East Grinstead) will find on further examination that no mistake has been made. The statement in Fownes's 'Manual' refers to inorganic compounds.

W. H. K. (Dover), and *Juvenis* (London).—Bentley's 'Manual of Botany,' Fownes's 'Manual of Chemistry,' Pereira's 'Manual of Materia Medica and Therapeutics,' 'British Pharmacopœia.'

Wanted, January, February, and June numbers of this Journal, 1865. Full price given. Apply to Elias Bremridge, 17, Bloomsbury Square.

Errata.—Page 460, paragraph at line 8, should follow table of analyses, page 459. Page 462, line 29, expunge "which had been replaced by a corresponding portion of protocarbonate."

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, Bloomsbury Square.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VII.—No. XI.—MAY, 1866.

OUR POSITION AND PROSPECTS WITH REFERENCE TO LEGISLATION.

At the conclusion of the last Session of Parliament, an impression prevailed that something would be done in the present Session towards settling the question of pharmaceutical legislation; and the fact that no steps have yet been taken for the introduction of a Pharmacy Bill this year, may be thought to indicate lukewarmness on the part of those representing the interests of Pharmacy, or a disinclination on the part of Government to entertain the subject or to undertake the responsibility of introducing a Bill relating to it. We believe, however, that the existing state of inaction cannot be justly ascribed to either of these causes. The subject has occupied the serious attention of the Council of the Pharmaceutical Society, and there is reason to believe it would have been entertained by Government if subjects of a pressing nature had not intervened. But with the measures now before Parliament, upon the success of some of which the existence of the present Ministry depends, it would obviously be vain to expect assistance from Government, and it has therefore been wisely determined not for the present to press it. This will perhaps occasion some disappointment and regret, but there is no reason to apprehend that the interests of Pharmacy, as represented by the Pharmaceutical Society, will suffer in consequence. We can afford to rest upon the position we have acquired, and by continuing in the course hitherto pursued, we shall not only maintain, but improve our position. With a list of members increasing in number and gaining from year to year additional importance from the augmenting proportion of those admitted by examination, with a flourishing institution, every department of which is in a state of vigorous and efficient activity, with zealous supporters and ample means for carrying out the objects for which we have laboured successfully for a quarter of a century, we need not be impatient of a little delay in the accomplishment of this one object of enlarging the basis of our operations, and obtaining additional powers from the Legislature.

When the fitting time arrives, and circumstances appear favourable for the attainment of what is desired, we feel confident that there will be no backwardness manifested by those who represent the interests of Pharmacy. That these parties are alive to the importance not only of taking action at the proper time, but also of acting in unison, appears from a correspondence that has recently passed between the Presidents of the Pharmaceutical Society and the United Society of Chemists and Druggists, a reference to which is made in the last number of the 'Chemist and Druggist.' The latter of those functionaries, writing on behalf of the Executive Committee of the body he represents, forwarded a copy of the following resolution :—"That the President of the United Society be requested to call upon or write to the President of the Pharmaceutical Society, to ascertain whether it is his opinion that the Council of that Society would be willing to co-operate with the Executive Committee of the United Society in urging and assisting the Government to introduce a Chemists and Druggists Bill into Parliament, based upon the recommendations of the Select Committee, and submitted to Government at the close of the last Session."

To this, Mr. Sandford replied as follows :—

"47, *Piccadilly, March* 17, 1866.

"Sir,—In reply to your note of the 16th inst., asking my opinion as to the willingness of the Pharmaceutical Society to co-operate with your Society '*in urging and assisting the Government to introduce a Chemists and Druggists Bill into Parliament, based upon the recommendation of the Select Committee*' of last year, I beg to say that it is the unanimous opinion of the Council of the Pharmaceutical Society that *urging* the Government at this time would be *useless, unwise*, and *impolitic*. The great press of matter before Parliament just now, connected with Reform, Rinderpest, and Fenianism, renders it almost certain that the Ministry will not adopt the recommendation of the Select Committee to introduce a Bill on the subjects in which we are interested during the present session. Should this expectation of delay, however, be incorrect, (and, for myself, I should much rejoice to find it so,) our Council will always be ready to assist the Government in arranging an efficient, and yet liberal, measure for the settlement of the question.

"I say 'an *efficient measure*,' and I think you will agree with me that a mere Poison Bill, fettering us with registration of sales and attendance of witnesses, prescribing a particular form of bottle in which poisons might be kept and sold, and a particular corner in our shops in which they should be placed, would be only an encumbrance to the statute-book, inoperative as regards the public, and especially objectionable to men who, if they be properly qualified to deal in dangerous articles, will each, according to the special circumstances of his case, adopt precautions far more conducive to the public safety.

"I have said also a '*liberal measure*,' and on this point I may add, that the Home Secretary is already in possession of the views entertained by the Pharmaceutical Society, and I believe no chemist and druggist, properly so called, could, whether he be now a member of our Society or not, fairly object to those views. Our desire is to make the compulsory parts of the Bill entirely prospective, and to give all persons registered under it equally easy means of access to the Society which should regulate the examinations, etc. To suppose that there will ever be two Societies for the same object established by law requires a stretch of imagination to which I am not yet equal, and is a thing, I believe, entirely beyond the hope—nay, even the desire—of the best members of your Society.

"I fully recognize the right of all persons '*governed*'—(but mind, I think '*governed*' is a strong expression for the present case)—to have a voice in the governing body, and I would for this reason carry the provisions of the Bill a little further than I have yet stated.

"You know the Select Committee resolved that there should be no compulsory registration for men already in business. I would nevertheless have a *voluntary* registration; and all able to bring the required certificate of their having been chemists, properly so called, should be entitled to that registration, and so have the same easy access I have mentioned before to the Society.

"These men would be in no way interfered with by the proposed legislation, but, being engaged in the same trade, I know many of them would like such a provision; and beyond that, I regard the union of all men of one calling as an important means for elevating the standing of the whole body.

"I have written rather fully on this matter, because I am anxious to assure you that there is really no foundation for the oft-repeated charge made against the Society, over which I have the honour to preside, of a desire to subjugate all chemists and druggists throughout the country to their authority; and I trust you will agree with me in thinking that the measure we desire to pass is one which would be beneficial, and ought to be supported by the whole trade.

"I have the honour to be, Sir,
"Your obedient Servant,
"GEORGE W. SANDFORD.

"*To Henry Matthews, Esq.,*
"*President of the United Society of Chemists and Druggists.*"

There is ground for encouragement in the spirit manifested in this correspondence, and in the prospect it seems to present, that when the next effort is made for the attainment of pharmaceutical legislation, those equally and alike interested in the result will not be found acting in opposition to each other.

SUBSCRIPTIONS TO THE BENEVOLENT FUND.

We alluded, last month, to the effects of personal exertion among some of our members in obtaining subscriptions to the Benevolent Fund, and there is fresh evidence, on the present occasion, of the increased interest generally felt with reference to this important feature of our institution. The fund has been gradually, but at times rather slowly, increasing ever since the formation of the Society. It was at one time intended that it should not be applied to the granting of pensions until the invested capital had reached the amount of £10,000; but last year it was determined at once to bring the granting of pensions into operation, and the wisdom of this decision is abundantly proved by the increase in the number of subscriptions which have since been received. Taking the first four months of the year, the amount received this year has been nearly double what it was for the same period last year. This is partly to be ascribed to increased general interest, and partly, no doubt, to individual exertion. If members in different parts of the country would follow the examples which have been set at Bath and elsewhere, the fund would soon be augmented to the amount formerly contemplated, and the benefits resulting from its application would be so far increased as to leave no further anxiety for the maintenance of this means of helping our necessitous brethren.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *4th April*, 1866,

Present—Messrs. Bird, Bottle, Brady, Davenport, Deane, J. B. Edwards, Evans, Hanbury, Hills, Morson, Orridge, Randall, Sandford, Savage, Squire, Standring, and Waugh,
The following were elected

MEMBERS.

Barrowclough, Alfred	Mirfield.
Beckett, William	Heywood.
Field, William	Paris.
Hodges, William	Chester.
Keevill, Robert	Clifton.
Owles, James John	Great Yarmouth.
Phillips, William	New Cross.
Robinson, Joseph Spencer	Alfreton.
Stoneham, Philip	London.
Weston, Charles	Guildford.
Weston, Samuel John	London.

BENEVOLENT FUND.

The sum of twenty-five pounds was granted from this Fund to a distressed Member of the Society, who has been rendered incapable of following his business from severe injuries received from an explosion of nitrous acid.

EXAMINATION, 18*th April.*

MAJOR (Registered as Pharmaceutical Chemists).

Davies, John Hugh	Newcastle-on-Tyne.
Goucher, John	Wellington, Salop.
Pasnin, Thomy	Mauritius.

MINOR (Registered as Assistants).

Cable, George Hughes	Dunmow.
Corner, Robert	West Hartlepool.
Doughty, Edward Thomas	London.
Heald, John Fenton	Wakefield.
Mathews, Henry	Hampstead.
Millar, John	Aberdeen.
Perress, John Clements	Southampton.
Sharp, John James	Newcastle-on-Tyne.
Squire, Peter Wyatt	London.
Watts, Charles Cracknell	Richmond.

REGISTERED APPRENTICES.

Name.	Residing with	Address.
Abraham, Thomas Fell	Messrs. Clay and Abraham	Liverpool.
Bessant, Frederick Railton	Mr. Reilly	Hampstead.
Bland, Thomas Frederic	Mr. Bland	Stourbridge.
Cooper, Ernest Frederic	Mr. Cooper	London.
Pratt, Walter	Mr. Benson	Liverpool.
Speakman, Isaac	Mr. Whittaker	Runcorn.
Warrior, Charles	Mr. Warrior	Northallerton.

BENEVOLENT FUND.

SUBSCRIPTIONS RECEIVED DURING APRIL:—

London.

	£	s.	d.
Bell, Wm. H., 48, Albany St.	0	10	6
Bird, Robert, Clapham.........	0	10	6
Bradley, John, Kilburn	1	1	0
Breton, Walter, 66, Cannon St.	0	10	6
Coles, C., 1, King's College Rd.	0	10	6
Cooper, Albert, Kensington ...	0	10	6
Dyson, William B., Kensington	0	10	6
Field, William, Brompton Rd.	1	1	0
Ford, Charles, Blackheath Rd.	0	10	6
Forrest, Richard, Celbridge Pl.	1	1	0
Francis, G. B., 5, Coleman St.	1	1	0
Gedge, W. S., 65, St. John St.	0	10	6
Goosey, Wm., Stepney.........	0	10	6
Grainger, E. J., Upper Clapton	1	1	0
Groves, E., Regent's Park Rd.	0	10	6
Hora, Henry W., 58, Minories	1	1	0
Hyslop, J. C., New Church St.	0	10	6
Lawrence, F., Kentish Town Rd.	0	10	6
Lloyd, Henry, Deptford	0	10	6
Lockyer, George, Deptford ...	0	10	6
Orpe, Thos., N., Old Kent Rd.	0	10	6
Palmer, Robert, Ovington Sq.	1	1	0
Sims, J. F., Hemingford Road	0	5	0
Turner, C. E., Great Russell St.	0	10	6
Weston, S. J., Westbourne Ter.	1	1	0
Wilson, T., Upper Holloway...	0	10	6
Young, George, Mill Wall......	0	5	0

Country.

	£	s.	d.
Abergavenny, Ackrill, George .	0	10	6
Alderley Edge, Hampson, R. .	0	10	6
Bedford, Anthony and Son ...	0	10	6
,, Taylor and Cuthbert	0	10	6
Beverley, Hobson, Charles ...	0	5	0
Bewdley, Newman, Robert ...	0	10	6
Bradford, Rogerson, Michael .	1	1	0
,, Hick, Joseph	0	10	6
Bridge, Thomas, James.........	0	5	0
Bridgnorth, Steward, William	0	10	6
Bridport, Beach, James	0	10	6
Chelmsford, Baker, C. Patrick	0	10	6
,, Baker, Garrad ...	0	10	6
,, Seaton, George...	1	1	0
Chipping Sodbury, Wheeler, J.	0	5	0
Crewkerne, Strawson, Henry...	1	1	0
Devizes, Madge, James C.......	0	5	0
Dover, Bottle, Alexander	1	1	0
Edinburgh, Allan, Bruce	0	5	0
,, Baildon, Henry C.	1	1	0
,, Buchanan, James .	0	10	6
,, Gardiner & Ainslie	0	10	6
,, Macfarlan and Co.	1	1	0
,, Mackay, John......	1	1	0
,, O. S.	0	5	0
,, Raimes and Co. ...	1	1	0
,, *Lasswade*, Macdonald, J.	0	5	0
,, *Portobello*, Kemp, David	0	10	6
Fareham, Peat, William	0	5	0
Glasgow, Hart, Hugh	0	5	0
,, Currie, John	0	5	0
Gloucester, Berry, Edward ...	0	5	0
,, Stafford, Wm.......	0	5	0
Halifax, Jennings, William ...	1	1	0
Harlow, Wood, John Edward	0	5	0
Harwich, Bevan, Charles F....	0	5	0
Heywood, Beckett, William ...	0	10	6
Hull, Earle, Francis	0	10	6
,, Hall, Henry, R. F.......	0	5	0
,, Metcalfe, Christopher L.	0	10	6
Ilford, Beal, Edmund John...	0	10	6
Ipswich, Chapman, Henry ...	0	10	0
Kaffraria, Daines, Thomas ...	0	10	6
Kidderminster, Bond, Charles	0	5	0
,, Steward, Josiah	0	10	6
,, Steward, Theo.	0	10	6
Kilmarnock, Borland, John...	0	10	6
,, Rankin, William	1	1	0
Leamington, Davis, Henry ...	0	5	0
,, Jones, S. Urwick	0	10	6
Leeds, Brown, Edward.........	0	10	6
,, Harvey, Thomas	0	10	6
,, Reynolds, Richard......	0	10	6
Leicester, Butler, Thomas E...	0	5	0
,, Cooper, Thomas......	0	5	0
,, Merryweather, Chas.	0	5	0
Llangollen, Jones, Humphrey	0	5	0
Maidstone, Rogers, William...	0	10	6
Manchester, Benger, F. B. ...	0	5	0
,, Carter, William...	0	10	6
,, Jackson, Thomas.	0	10	6
,, Paine, Standen ...	0	5	0
,, Walsh, Edward .	0	10	6
,, Wilkinson, Wm. .	0	10	6
,, Williams, Edwin .	0	5	0
,, Wright, Charles .	1	1	0
,, *Salford*, Manfield, J. W.	0	5	0
Newcastle-on-Tyne, Brady, H. B.	1	1	0

	£	s.	d.
Newcastle-on-Tyne, Proctor, B.	1	1	0
Newcastle-under-Lyme, Cartwright, William	0	10	6
Newport, Mon., Pearman, H.	0	5	0
Oxford, Prior, George T.	0	10	6
Ramsgate, Morton, Henry	0	5	0
„ Sawyer, Thomas	0	5	0
Romford, Lasham, John	0	5	0
Rugby, Garratt, John C.	0	5	0
„ Garratt, Samuel	0	5	0
„ Lewis, Thomas C.	0	5	0
Ryde, I.W., Dixon, Henry	0	10	6
„ Gibbs, William	0	10	6
„ Wavell, John	0	10	6
Shaftesbury, Powell John	0	10	6
Shrewsbury, Blunt, Thomas	0	10	0
„ Cross, William G.	0	10	0
Southport, Ashton, William	0	10	6
Southsea, Rastrick and Son	0	10	6
St. Alban's, Roberts, Albinus	1	1	0
Stourbridge, Bland, John H.	0	10	6
„ Hughes, Samuel	0	10	6
„ Morris, Alfred P.	0	10	6
„ Nickolls, James	0	4	0
Stowmarket, Simpson and Son	0	5	0
„ Sutton, Chas. W.	0	5	0
Sunbury, Leare, James	0	5	0
Sunderland, Aslin, John	0	10	6
„ Ritson, John G.	0	10	6
„ Ritson, Thomas	0	10	6
„ Scarrow, William	0	5	0
„ Walton, John	0	10	6
Thame, Booth, Samuel	0	10	6
Torpoint, Down, Richard H.	0	10	6
Watford, Chater and Son	1	11	6
Wrexham, Francis, John	0	10	6

DONATIONS.

	£	s.	d
Ballard, Charles B., Canonbury	1	1	0
Clark, John Webster, *Leicester*	1	0	0
Evans and Webb, Old Cavendish Street	0	10	6
Forbes, William, *Reigate*	1	1	0
Highway, Henry, *Walsall*	1	0	0
Lacey, Walter, *Bristol*	1	0	0
Lavers, Thomas H., *Blackheath*	1	1	0
Taylor, Sydney, *Pendleton*	0	10	0

PHARMACEUTICAL MEETING.

Wednesday, April 4th, 1866.

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,—British Journal of Dental Science,—Chemist and Druggist,—Photographic Journal,—L'Union Pharmaceutique: from their respective Editors. Proceedings of the Royal Society,—Journal of the Chemical Society,—Journal of the Society of Arts: from the respective Societies. Year Book of Pharmacy: from the Authors (Messrs. Wood and Sharp). On Ether: from Mr. Martin H. Payne.

The following papers were then read:—

ON PHARMACEUTICAL HERBARIA.

BY DANIEL HANBURY.

That the well-educated pharmaceutist should possess a certain familiarity with the plants employed in medicine and especially with those indigenous to his own country is a proposition upon which there can scarcely be any difference of opinion. The effort of mind and habits of observation brought into requisition in order to obtain such knowledge, are in no small degree beneficial;

while the agreeable reminiscences called forth by an inspection of the plants gathered in years long passed, are such as may well repay the trouble of forming and preserving an herbarium.

But it is not the formation of a general herbarium or even of an herbarium of British plants, interesting and valuable though they are, that I venture now to advocate. I wish rather to point out the advantage to the student of being able to consult a small collection of medicinal plants preserved in herbarium-form, and to draw attention to the ease with which such a collection may be formed. One of the regulations imposed by a paternal but despotic government on the continental apothecary is that he shall provide and maintain in good order for the use of his apprentices, an herbarium of medicinal plants. Let us draw a lesson from this. In the British Pharmacopœia about 170 plants are enumerated as furnishing the vegetable Materia Medica prescribed in that work; and of this number more than 50 are either indigenous to or are cultivated in Great Britain. An herbarium comprising even four-fifths of this number would be no unimportant aid to the student who was "reading up" a subject so uninviting to most as Materia Medica. I would not however restrict my herbarium to the plants of the pharmacopœia. There is a considerable number that are used in rustic medicine, some of which were held officinal by the London College of Physicians but a few years back. As instances of this, let me enumerate Woodsorrel, Sweet Flag, Garlick, Marsh Mallow, Asarabacca, Bistort, Bitter Cress, Lesser Centaury, Quince, Carrot, Black Hellebore, Elecampane, Lettuce, Bay, Common Mallow, Horehound, Pennyroyal, Wormwood, Buckbean, Tormentilla, and Coltsfoot. To this number may be added with advantage certain plants which are interesting to the pharmaceutist from their liability to be confounded with others that are officinal, as *Pyrethrum* and *Matricaria* which may be mistaken for Chamomile, Fool's Parsley supposed sometimes to do duty for Conium, Hawkbit and *Rhamnus Frangula* which it is said have been passed off for Dandelion and Buckthorn.

As to exotic medicinal plants, the difficulty of obtaining specimens would, I must admit, be far greater and the pharmaceutical herbarium must inevitably contain many blanks. Still as the Pharmaceutical Society numbers over 40 members resident in foreign countries, it would not, I believe, be impossible to interest some of them in procuring and forwarding to our secretary specimens for distribution of some of the commoner economic plants occurring in their respective districts. In this way our pharmaceutical herbariums might be enriched with such tropical plants as the Clove, Cinnamon, Allspice, Cassia Fistula, Pareira Brava, Quassia, etc.

One of the more complete herbaria of the character I have attempted to describe, ought to be preserved at Bloomsbury Square, and others in the rooms of the Branch Societies at Edinburgh, Liverpool, etc.; but in addition I would suggest to those who feel or wish to feel interested in botany, to commence themselves the formation of an herbarium of medicinal plants, taking as a nucleus those commonest plants of our gardens, fields, hedge-rows and commons, the Cherry-Laurel, Lavender, Dandelion, Bittersweet, Elder, Foxglove, etc.

It is unnecessary here to describe the simple operation of preparing botanical specimens (an operation for which a pharmaceutist has several facilities); but a few words may be said on the best method of mounting them so as to render them at once convenient for reference, and as little liable as possible to sustain injury from handling and from the depredation of insects. In the first place it should be a rule that no specimen should be mounted unless previously brushed over with an alcoholic solution of Corrosive Sublimate, a precaution against the ravages of a certain mischievous little beetle, extremely ready to prey on dried leaves. Specimens having been subjected to this operation, should be re-dried with slight pressure and are then ready to be fastened to the paper on which they are to be ultimately preserved. This may be done simply with short, narrow strips of paper, gummed or glued so as to hold down the stems and more prominent parts. Specimens thus fastened can be readily removed, when it is desirable to replace them by better; but for an herbarium that is to be frequently handled (and by others than its owner) it is preferable to resort to a method of attaching specimens still more secure, and this is conveniently effected by the use of common glue brushed while hot over at least a portion of the specimen. Strips of gummed paper may be conveniently used in addition for the better securing of woody stems, roots, bulbs, and such like. The paper on which specimens are mounted should be good and stout, and in oblong pieces measuring about 17 inches by 10. The usual method of putting-by mounted specimens is to place them loose in brown-paper covers, which are afterwards arranged one above another in the pigeonholes of a cabinet. For an herbarium specially pharmaceutical, comprising as it necessarily would but a limited number of specimens, a large book made so as to open flat, would probably be even more convenient than the ordinary loose sheets in covers. The specimens would be retained in proper sequence, and be more compact and manageable than if upon separate sheets. Some well-arranged volumes of this kind would afford much of the benefit to be derived from engraved figures:—in fact in many cases, the examination of an actual specimen is far more impressive and informing than the inspection of a plate. The authors of the British Pharmacopœia have carefully mentioned in what works figures may be found of the several plants enumerated in that volume. The number of works thus referred to is twenty-six; many of them are of great rarity and quite inaccessible to the majority of persons who would wish to consult them,—while to purchase the whole series a sum would be required approaching £230.

I trust I have said sufficient to show that the formation of herbaria of medicinal plants is a subject that merits some attention at the hands of the Pharmaceutical Society.

ON MEDICATED PESSARIES AND SUPPOSITORIES.

BY HENRY B. BRADY, F.L.S., ETC.

The subject of medicated pessaries and suppositories, upon which I propose to make a few remarks this evening, is, without doubt, one of much importance to the pharmaceutist, and as the whole attention that has been devoted to it at these meetings seems to be covered in the Journal reports by two paragraphs of about four lines each, it cannot be necessary for me to commence by apology for its introduction. The absence of any uniform practice in the mode of dispensing pessaries or suppositories, such as exists in the case of mixtures or pills, of powders or liniments, is apt to give rise to serious annoyance. What would not a dispenser give, when a prescription for medicine, in either of these forms, is presented at the counter, to know exactly how it has been compounded at any other pharmacy,—and how his mode of dispensing it would bear comparison with what might be obtained at the next establishment the prescription might visit? His anxiety would not be in any way connected with the active part of the medicine; he would be perfectly conscious that if the patient had the prescribed constituents in any reasonably convenient form, the properties would not be affected by circumstances of shape or external appearance, yet in these minor details of dispensing his entire difficulty would lie. It becomes, therefore, a matter of considerable consequence to us that the subject should be reviewed, in order to determine what is the best rule of practice.

As members of the fourth estate of the medical profession, we have little to do with the therapeutics of either pessaries or suppositories, and hence my communication will be very much confined to what we may term their "practical pharmacy," and I shall, in the first place, speak of suppositories.

Although suppositories have long been used by medical men, we had no recognized officinal formulæ for their preparation until the publication of the British Pharmacopœia in 1864; since that time their employment has become very general. The Pharmacopœia formulæ are limited to two, namely, one for the administration of morphia, the other for the use of tannic acid. Probably every dispenser, in his experience, has found reason to bewail the clumsiness and want of definition in the directions for the preparation of both of those. In addition to the fact, that a mixture of lard and wax is by no means the best basis that can be used, the processes are needlessly complicated. So long as it was the custom to make the substance of a suppository or pessary a comparatively soft ointment, there was an obvious advantage in coating it by dipping into a melted material containing a larger proportion of *wax*, for the sake of giving it additional firmness; but why a body formed of equal parts of lard and wax should be dipped into a melted mixture of three parts of wax with eight parts of lard has always puzzled me, and whilst there are many objections to it I can see no good result to be obtained from the process. The use of sugar for dividing the morphia is equally open to objection, especially if a mould be used for forming the cones; I have seen suppositories made in this way with the sugar collected at the apex in a little, hard, sharp point; by no means a desirable armature under the circumstances. Medical men, too, complain that the dose of morphia is too small; and if the generally received opinion be correct, that a much increased quantity of a medicine is required when administered *per anum* (except in case of topical irritants like podophyllin), there appears some ground for the conclusion. Moreover, it is a desirable if not almost an essential quality in a pharmacopœia preparation, that it should possess certain keeping properties, but these undergo considerable change from any prolonged exposure to the air.

Having thus found as much fault as I may, consistent with due respect, with the Pharmacopœia formulæ, I propose to give the results of a number of experiments on those portions of the subject which affect us most nearly, namely, on the best basis and on the most convenient modes of forming suppositories.

We may admit, to begin with, without fear of contradiction, that the wax and lard basis is objectionable; and further, that if anything like a successful substitute be obtained, the process of dipping is unnecessary.

Amongst the materials which have been proposed for such purposes none has so great a claim to our attention as the theobroma oil, or butter of cacao. Its great firmness, combined with low melting-point, and its non-liability to turn rancid even when in contact with metallic salts, are precisely the qualities we should first look for in providing a satisfactory medium. Its aromatic odour is also in its favour; by keeping it becomes harder rather than softer, whilst its melting-point remains the same; it is easily obtainable, and the price is not such as to be any drawback to its use. So far as my experience goes, there are, *per contra*, but two minor objections to be stated: firstly, that it is somewhat brittle; and secondly, in moulding the cones it does not leave the mould well, but is liable to adhere to the sides. To remedy these trifling defects, the least objectionable admixture seems to be a small proportion (5 to 10 per cent., according to the weather) of lard. If, as I suspect, the theobroma oil owes its keeping properties to the presence of an aromatic principle rather than to the more stable constitution of the fat itself, we should probably find that it would retain its character when mixed with a larger proportion of other material, and we might probably obtain a still better basis. A mixture of four parts of the theobroma butter with two parts of lard and one part of wax has pretty much the same good qualities as the butter itself, with the advantage of more easy manipulation; and the operator has the opportunity of rubbing down in a mortar the morphia, tannic acid, or other medicinal substance employed, with a portion of the lard, and thoroughly mixing it before adding it to the melted mass, thereby saving himself much subsequent trouble, and rendering the use of sugar or other hard substance unnecessary.

As the observations I have to make on the modes of forming or making up suppositories apply equally to medicated pessaries, I may make a few remarks on the latter before dealing with the considerations arising out of the mechanical portion of the subject.

Medicated pessaries may be said, practically, to have been originated by Professor Simpson, of Edinburgh, some twenty years or more ago; and though, from their very nature and the limited class of cases in which they are used, the number prescribed is not very great, still the increasing acceptance amongst medical men of Professor Simpson's views in respect of the advantage they offer has caused a very general demand for them in localities south of the Tweed. With the purely medical and therapeutical portion of the subject we have little to do; and, in place of occupying your time with matters pertaining rather to the office of the obstetrician than the pharmaceutist, I may refer you for such details to a paper of Professor Simpson's, read before the Obstetric Society of Edinburgh in 1848;* to a communication by Dr. Tanner in the 'Transactions of the Obstetrical Society of London,' 1863;† or to a second paper by Professor Simpson read before the Edinburgh Society, and printed in the 'Edinburgh Medical Journal' for May, 1865.‡ It is sufficient here to state that the object in view is to have a means of applying medicinal substances to the vagina and cervix uteri, for the relief of various diseased conditions of those organs. It is necessary, in the preparation of an excipient for the various medicines used in this way, to bear in mind the conditions under which it is to be used. The qualities to be sought are precisely those I have dwelt upon as desiderata in the case of suppositories, viz. firmness at ordinary temperatures combined with a very low melting-point, and non-liability to decomposition. Hence the wax and lard compound originally recommended by Professor Simpson is objectionable, and in his later paper has been abandoned in favour of the cacao butter. Dr. Tanner, in his paper above alluded to, proposes as a basis the cacao butter and olive oil, in the proportions of four parts to one; and his formulæ seem to be pharmaceutically unexceptionable, though I must confess to a preference for either lard or, in some cases, almond oil, as a softening ingredient.

Some objection has been raised on the ground of the price of the theobroma oil, and it is perhaps just worth while to inquire whether any less expensive material may be found which will fulfil the same conditions. In my search for such a substance, cocoa-nut stearine§ was named to me as worth trying, and, after a number of experiments, I am inclined to believe it may be made to work well. Acting partly under the impression that the keeping properties of theobroma oil were due to its aromatic constituent, and partly on the strength of the results obtained by Mr. T. B. Groves in the prevention of rancidity in fats mixed with metallic oxides, by the use of aromatic essential oils, I have in my experiments always used a small percentage of oil of pimento.

A mixture composed of

Cocoa-nut stearine . . .	9 oz.
Lard	1 oz.
Oil of pimento	20 minims,

* Printed in the Edinburgh Monthly Medical Journal, June, 1848, p. 886. Reprinted in Professor Simpson's Obstetric Works, vol. i. p. 98.

† Reprinted in Pharmaceutical Journal and Transactions, 2nd series, vol. iv. no. 12, p. 514.

‡ Reprinted as a circular by Messrs. Duncan, Flockhart, and Co.

§ Cocoa-nut stearine is to be obtained from Price's Patent Candle Company, at about one shilling per pound.

seems to keep unchanged for any reasonable length of time, and leaves little to be desired as a basis for pessaries. The lard is introduced partly as a tempering medium, and partly, as suggested when speaking of suppositories, to facilitate the proper division and admixture of the medicinal substance before adding to the melted stearine. When the substance is bulky, as in case of tannin, a small quantity of almond oil may be added with advantage. In the same way, where such crystalline salts as iodide of potassium are required, glycerine may be substituted for either lard or oil, as suggested by Dr. Tanner. The comparative stability of the fats obtained from the cocoa-nut is no new fact; my friend Mr. Reynolds informs me that many years ago, in search for the best and least easily decomposed material for ointments containing solution of diacetate of lead, theobroma oil being then comparatively unknown, he found nothing answer so well as cocoa-nut oil.

Having determined the best formula for an excipient, we are still only at the outset of our work, so much depends upon the mode in which its subsequent manipulation is conducted. The Pharmacopœia, in its directions for the preparation of suppositories, is exceedingly vague :—" When the mixture has solidified, divide the mass into twelve equal portions, to be formed into cones, which are to be allowed to stand until they acquire sufficient firmness." Its vagueness, however, has the advantage of leaving a great deal to the discretion of the operator. A desire for a little more uniformity and finish than the primitive means of a slab and palette knife would yield, led me, soon after the publication of the Pharmacopœia, to suggest to Messrs. S. Maw and Son a form of mould for casting the cones; and I believe that they have since then supplied to a number of pharmaceutists moulds made from the same pattern. It is a very simple contrivance—a piece of gun-metal, dividing down the middle, with holes bored in it of the desired size and shape, the metal being plated, with the view of preventing corrosion. The first they made was of small size, for six suppositories; but more recently they have constructed a larger pattern for twenty-four, somewhat improved in form, and provided with hinges at the bottom for convenience in opening and greater accuracy in fitting. (Fig. 1.) Both of these,

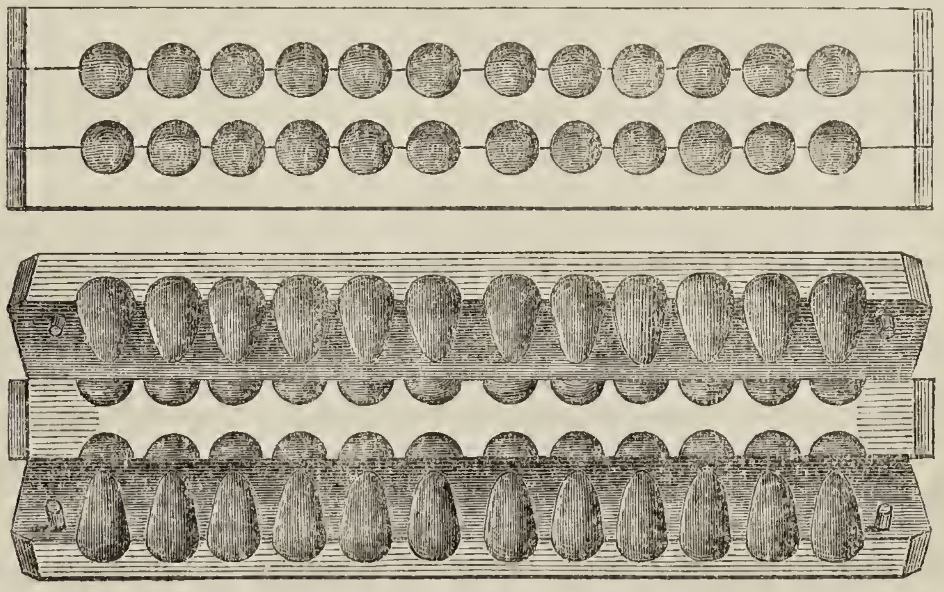


Fig. 1.

and a mould for pessaries of similar construction to the first, except in point of size, are upon the table.

A somewhat different contrivance, represented by the annexed woodcut (Fig. 2), has been tried, but it possesses no advantage over that just described, and there are some inconveniences attending its use. It is made somewhat on the principle of a common bullet-mould, but the long handles, suitable enough for melted lead, are unnecessary for our purpose, and the position of the hinge, at one end of the instrument, gives it an undesirable tendency to gape.

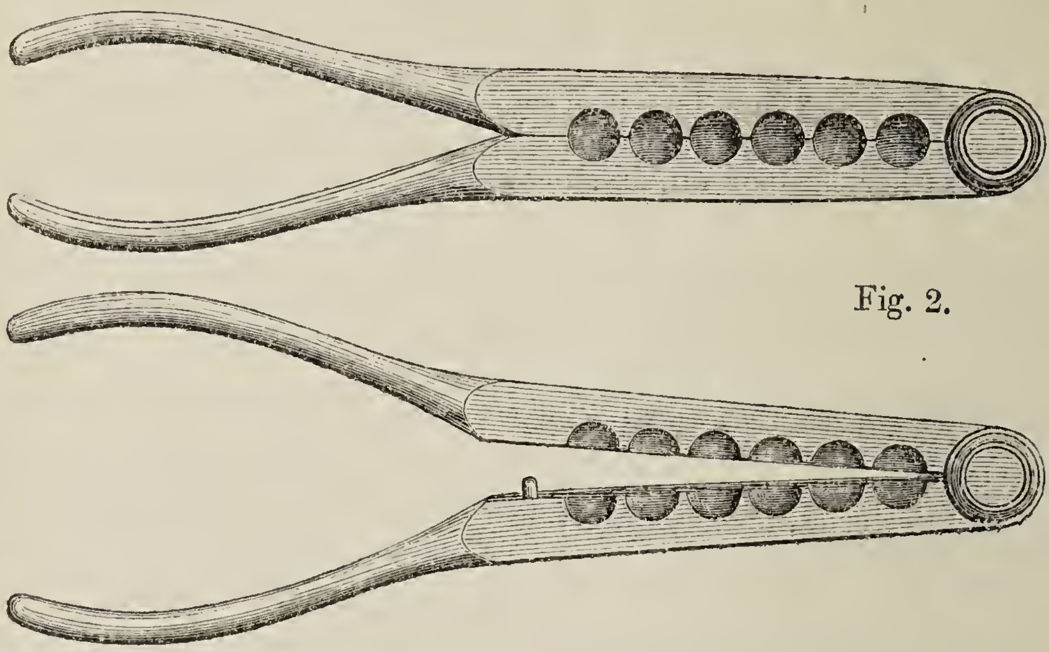


Fig. 2.

Another mode of forming the cones, possessing some advantages where large numbers are required, is by means of extemporaneously prepared clay moulds. A large piece of potter's clay, well tempered, is rolled out into a sheet a couple of inches thick, in which holes are made of the required depth by means of a piece of hard wood turned at the end into the form of a pessary or suppository. I confess, when I first tried this plan I expected it to yield a great saving of time and labour, but I was disappointed at the outset. With the very natural idea that the more perfect the model the better the mould it would form, I had a couple of well-finished "dibbles" made in brass, which appeared to be everything that could be desired—indeed they had but one fault, viz. that practically they would not answer: from their very smoothness, and the consequent close adhesion of the clay, the sides were sucked in on withdrawing the model. Failures are sometimes more instructive than successes, and having recourse to a humbler material—hard-wood—I found the difficulties much lessened, though the resulting suppositories or pessaries are seldom quite so symmetrical or well formed as when prepared in metal moulds. The process has this advantage, that the size can be varied within certain limits by making the hole deeper or shallower. On the other hand, they seldom leave the mould quite clean, and require washing and trimming before they are sent out. The clay is pulled to pieces to liberate the suppositories, and may be used over and over again.

There is still another method which I may mention, but for want of experience can do no more. This consists in the formation of paper moulds, which are set in magnesia or lycopodium, and then filled. I understand that there is some peculiar French paper made for the purpose, and that the operation is not a difficult one, but I know nothing practically of its working.

On the whole, metal moulds will be found the most convenient, and for dispensing purposes, the only ready means of forming either suppositories or pessaries. A copper ladle, tinned inside, set in a basin of hot water, holds the melted material whilst the successive lots are being cast. If a basis composed chiefly or entirely of theobroma oil is used, considerable time must be allowed for cooling, for it remains soft, and is with difficulty released from the mould, long after it appears to be set.

The *size* and *shape* of both pessaries and suppositories are matters of considerable moment. Pessaries may be dismissed with a few words. Two drachms is the generally approved weight, and, since Professor Simpson proposed the Minié bullet shape in place of the round balls originally used, it has been generally adopted. A trifling exception exists in those cases in which the pessary is made the vehicle for the exhibition of chloroform or other fluids; but as under these circumstances the excipient is generally prepared extempore by the medical man himself, it scarcely affects the pharmaceutist.

But in respect to suppositories there is much more to be said. The size ordered in the Pharmacopœia is about 8 grains *plus* the coating, say 12 grains in all, for those containing morphia, and about 14 grains *plus* the dipping, say 18 grains in all, for those with tannic acid. And as some chemists are in the habit of making them as large as from 25 to 30 grains, the variations met with are very liable to cause annoyance. There seems no reason why a uniform weight of 15 grains should not be adopted. This would not be too large for the medicines given in small doses, whilst a smaller weight would scarcely answer for the bulky constituents sometimes ordered. Something like uniformity in size is essential, if we desire to use the same moulds for the preparation of the various formulæ. A not uncommon prescription consists of 1 grain of aloin and 4 or 5 grains of powdered soap, with a sufficient quantity of theobroma oil, and this may be readily dispensed in a 15-grain mould; the same may be said of the tannic acid and opium suppositories often ordered. Our formulæ for pill-masses are all constructed with a view to 5-grain pills, and it is only asking that the same principle may be carried out in respect to another and somewhat similar class of preparations.

As to the *shape*, the word "cone" is, I suppose, intended in a general rather than a geometric sense. A somewhat elongated Minié bullet shape is obviously an improvement on a direct straight-sided form with sharp-pointed apex.

It is not uncommon to see both suppositories and pessaries coloured pink. Except this be to distinguish particular varieties,—such as, for instance, when those containing morphia are kept of two or three different strengths,—I see no reason for giving way to fancies. No one would think of making pink spermaceti ointment. If colour be desired, a small addition of alkanet oil, or of the dark crimson lip-salve, prepared by many chemists, will produce the result.

I have in these remarks entered somewhat into details, knowing that any value they possess can only be in the practical assistance they may afford to those who have to perform the processes they are intended to elucidate. Every pharmaceutist ought to be prepared to make either pessaries or suppositories when they are ordered by the physician, and should be as particular about the neatness and workmanlike appearance of what he turns out as he would be about a box of pills or powders.

It seems to be generally acknowledged that the list of suppositories in the Pharmacopœia might be increased with advantage in a new edition; and this would be very simply done, if a uniform size were adopted and a basis agreed upon suitable for all the medicinal substances employed. Setting aside the present defective formulæ, which might be replaced by simpler ones with somewhat increased doses: say—morphia $\frac{1}{2}$ grain and tannic acid 5 grains, there might be added a few of the more commonly prescribed forms. It would, of course, be as absurd to propose the insertion of a long list of formulæ as to apply the same process to the prescriptions for mixtures or pills which are brought to us to be dispensed.

Of the list of Suppositories given in Professor Simpson's paper, before quoted, probably the following would be suitable for recognition:—

Belladonna (4 grains extract).
Mercurial (6 grains ung. hydrarg.).
Powdered gall (5 grains) and opium (1 grain).
Acetate of lead (5 grains) and opium (1 grain).
Aloin (1 grain) and powdered soap (5 grains).

Gamboge (5 grains).
Santonine (5 grains).

The formulæ for PESSARIES in Professor Simpson's first paper are seven in number, and contain respectively:—

Oxide of zinc	15 grains.
Acetate of lead	$7\frac{1}{2}$,,
Mercurial ointment . . .	$\frac{1}{2}$ drachm.
Iodide of lead	5 grains.
Tannin	10 ,,
Alum and catechu . . .	15 grains of each.
Belladonna	10 grains (extract).

In Dr. Tanner's paper six formulæ are given, viz.:—

Iodide of lead 10 grains, with extract of belladonna 5 grains.
Mercurial ointment 10 grains to $\frac{1}{2}$ drachm.
Acetate of lead 5 grains, with extract of opium 3 grains.
Oxide of zinc 15 grains, with extract of belladonna 3 to 5 grains.
Iodide of potassium 15 grains, with extract of conium 1 scruple.
Tannin 10 grains, with catechu 15 grains.

In Dr. Simpson's later paper the list is a much more extensive one, embracing formulæ containing borax, carbolate of lime, carbonate of soda, exsiccated sulphate of zinc, perchloride of iron, bromide of potassium, and a number of other remedies.

I can scarcely conclude without acknowledging the obligation I am under to Messrs. Maw and Son, of Aldersgate Street, for the time and trouble they have expended in carrying out my views as to the best form of mould for these purposes. One seldom finds a business house on so enterprising a scale, so ready to meet the views of experimenters, even in very small particulars.

Mr. D. HANBURY wished to call the attention of the meeting to a collection of Pessaries and Suppositories of various kinds and very superior manufacture, exhibited by Mr. J. L. Bosley, of 128, Brompton Road. Mr. Hanbury was sorry that Mr. Bosley was not present, but he believed the composition of the articles exhibited was stated on the labels.

Mr. BRADY said that he did not approve of the shape of Mr. Bosley's specimens, but considered those now exhibited and prepared by himself as far preferable in that respect.

Mr. T. H. HILLS agreed with Mr. Brady in his remark that formulæ for Suppositories and Pessaries should be included in the Pharmacopœia, as it was difficult to prepare them extemporaneously. But with respect to the material to be used, he was of opinion, from his experience, that cacao butter, from its low melting-point, and from its being so cleanly, was better without any admixture of lard.

Mr. GALE thought that all pharmaceutists would thank Mr. Brady for his practical paper. He had himself experienced similar difficulties, but had overcome them by the use of pewter moulds with a small hole in the bottom. He had observed a slight decomposition in iodide of potassium pessaries made with cacao butter.

ON THE PURGATIVE ACTION OF CERTAIN EUPHORBIACEOUS SEEDS.

BY E. J. WARING, M.D., F.L.S.

To the student of Medical Botany there is perhaps no single Natural Order which presents for his consideration so many subjects of interest and importance as the *Euphorbiaceæ*, comprising, as it does, above 2500 species, widely diffused over the face of the globe. It presents us with a vast variety of plants differing from each other no less in general habit and configuration than in properties and uses. To the non-botanically trained eye it seems, at first sight, almost incredible that the Cactus-like, leafless *Euphorbia*, the stately *Siphonia elastica* which often attains a height of sixty feet, and the little humble weed *Mercurialis annua*, should be members of the same family, but, examined scientifically, their botanical relationships become clearly established.

Commensurate with the striking differences observable in external configuration and habit, are the properties and uses of various members of this Order. Belonging to it are many virulent acrid poisons, in the foremost rank of which stands the far-famed Manchineel Apple (*Hippomane Mancinella*, Linn.) of the West Indies; in juxtaposition with which, for the sake of the contrast, we may place the East Indian tree *Emblica officinalis*, the sub-acid, perfectly innocuous immature fruit of which has attained some repute in India as an antiscorbutic, whilst the mature dried fruit constitutes the Emblic Myrobalan, valued in the arts as an astringent. This Order supplies us with purgatives of all degrees of potency, from the hydragogue drastic cathartics, croton oil and euphorbium, to the much-used castor oil, which, in appropriate doses, may be given to young infants with perfect safety. On the other hand, the Brazilian plants *Croton Draco*, *C. sanguifluus*, and *C. hibiscifolius*, yield a red astringent juice, which, in the inspissated state, constitutes one of the kinds of Dragon's-blood of the Western hemisphere, and is supposed to approximate to kino as an astringent. Dr. Zollickoffer (Lond. Med. Bot. Trans. May 28, 1824) adduces evidence to prove the powerfully astringent and slightly narcotic properties of *Euphorbia hypericifolia*, Linn., a plant of North America. That country also produces two other plants, *Euphorbia Ipecacuanha* and *E. corollata*, which find a place in the Secondary List of the United States Pharmacopœia on account of their emetic properties, in which respect they are thought to approach Ipecacuanha, both in efficiency and safety. Then, tonics of various qualities are derived from this Order. Amongst the aromatic tonics we may mention Cascarilla, the bark of *Croton Eluteria*, Bennett, and Copalchi from *C. pseudo-China*. Malambo bark, apparently an aromatic tonic of no mean value, the botanical origin of which was, for a long period, involved in obscurity, has been traced to a tree of this Natural Order, *Croton Malambo* of Karsten. Of astringent tonics we have apparently a worthy representative in the bark of *Kirganellia elegans*, Juss., a tree of the Mauritius, in which island, according to Bouton (Med. Pl. of Mauritius, p. 133), it enjoys a high and merited repute in dysenteric, and other bowel affections. Amongst the alterative tonics we may mention the wood of *Buxus sempervirens*, the common Box, which, on the Continent, has been employed as a substitute for guaiacum, and the leaves of *Croton antisyphiliticus*, Mart., a plant of Brazil, which, as its specific name indicates, is an esteemed alterative in venereal affections. The officinal anthelmintic Kamela is derived from a tree of this Natural Order, *Rottlera tinctoria*, a native of India; and Martius has identified a favourite Abyssinian anthelmintic *Atantash*, with the root of *Euphorbia depauperata*, Hochst. In India, *Phyllanthus urinaria* and *Euphorbia Nivulia* are held in much esteem by the natives as diuretics. In the Cape de Verde Islands, the leaves of *Ricinus communis* and *Curcas purgans* are employed extensively as a lactagogue and emmenagogue; and the facts adduced by Dr. M'William have, at any rate, with regard to the first of these, been substantiated by Dr. Routh and others in England. Lastly, the milky juice of several of the Euphorbias, and the expressed oil of the seeds of *Croton Tiglium* and *Jatropha glandulifera*, externally applied, are powerful rubifacients and counter-irritants.

We cannot close this long list without mentioning a few other articles, not strictly medicinal, derived from this Order:—1, Tapioca, so well known as an article of diet for the sick, prepared from the root of *Manihot utilissima*, Pohl; 2, Caoutchouc, or india-rubber, the dried milky juice of *Siphonia elastica*, Pers.; 3, Chinese vegetable tallow, from the seeds of *Stillingia sebifera*, Mich.; and 4, a kind of lac, called, from the locality in which it is obtained, *Ceylon Lac*, the produce of *Croton lacciferum.*

Such is a hasty sketch of the Natural Order *Euphorbiaceæ*, looked at from a medical point of view, and it may be safely asserted that in no other Natural Order, not even in *Leguminosæ*, do we find plants possessed of such diversified virtues. From it, as we have seen, we are able to obtain fatal poisons, and a mild nutritious article of diet for the sick; purgatives, astringents, tonics, alteratives, diuretics, anthelmintics, emmenagogues, lactagogues, rubifacients, counter-irritants, and a mild emollient tallow, not altogether unsuited for pharmaceutical and medicinal purposes as an emollient.

From what has now been said, it will be manifest that my statement as to this Natural Order opening a wide field of research, is strictly correct. To have attempted to grapple with the whole subject in the compass of a single short lecture would, it is evident, have been utterly futile; I shall, therefore, content myself this evening with noticing some facts and general ideas with reference to the purgative action of the oleaginous seeds of some individuals of this Order, viz. *Croton Tiglium* (the Croton Oil plant), *Curcas purgans* and *C. multifidus* (English and French Physic Nuts), *Euphorbia Lathyris* (Caper Spurge), *Hura crepitans*, *Ricinus communis* (Castor Oil plant), *Anda Gomesii*, *Aleurites triloba,* and *Omphalea triandra.*

It will serve materially to elucidate and confirm the observations I purpose making at the conclusion of this paper, if we pass in review each of these articles individually, which we will do as briefly as the importance of the subject permits. And it may serve still further to simplify the subject to say, in this place, a few words as to the structure of the seeds which are to engage our attention this evening. Each seed, then, has an outer, hard, brittle case or husk (*testa*); lining this, is a fine, thin, brittle, more or less light-coloured membrane (*endocarp*); this encloses a whitish or yellowish oily albumen, or nucleus, popularly called the kernel. Within the two halves or valves of this albumen is enclosed the embryo, with its large foliaceous cotyledons. We will consider the seeds in order, according to their degree of potency.

1. Croton seeds, the produce of *Croton Tiglium*, Lin., a small tree, inhabiting the tropical portion of the Eastern hemisphere. In their crude state these seeds are possessed of powerfully irritant properties. The only case of poisoning by them, that I have met with, is a notice in Pereira's 'Materia Medica' (vol. ii. pt. i. p. 406), given on the authority of the late Dr. Wallich, in which it is stated that one fresh seed proved fatal to a labourer in the Calcutta Botanical Gardens. Cases of poisoning by the expressed oil, however, are not very rare; several such are on record, and are mentioned in the works of Christison, Taylor, and other toxicologists. The general train of symptoms are intense and persistent burning sensation in the fauces and œsophagus, abdominal tenderness and pain, violent efforts at vomiting, hypercatharsis, laborious breathing, cold sweats, blueness of the lips and fingers, an almost imperceptible pulse, and intense thirst. The principal appearances on dissection are an inflamed and softened state of the intestinal mucous membrane; indeed the oil, and it is presumed also the seeds, in their crude state, exercise a specific influence on this membrane, as, when death has followed in animals into whose systems the oil has been introduced by injection into the veins, the whole of the intestinal canal has been found in a state of inflammation, and when applied to a blistered or denuded surface, it speedily induces a cathartic operation. It is deserving of notice, that in a case of poisoning by the inhalation of the dust of the seeds,

occurring in a labourer in the East India warehouses, recorded by Pereira (p. 406), though there was great prostration of the vital powers, cold surface, collapse, in fact, with severe pain in the throat, head, and stomach, swelling and numbness of the tongue, dilated pupil, etc., yet there was no purging; and this is a very important fact to remember, in connection with the subject we are now considering. It is probable that the symptoms detailed arose from the action of a peculiar volatile principle, perhaps from crotonic acid, a principle discovered by Pelletier and Caventon, which, though inert according to Professor Redwood, was found by Pereira to possess a strong nauseous odour, and to be very irritant to the eyes and nose. It is certain, we may remark *en passant*, that the purgative action of the seed does not reside in this acid.

It also appears certain that simple pressure, however powerful, fails to extract from the seeds the whole of the active principle, be that what it may; as we find that it is the practice amongst the French pharmacologists to subject the residuum, after expression, to the action of alcohol, that the fluid so obtained possesses active purgative properties, and that, after the alcohol has been removed by distillation, the remaining oil is added to that previously obtained by expression.

Before parting with these seeds, I may mention that when stationed in Burmah, I largely employed the prepared seeds as a purgative, and as such found them safe and effectual. For this purpose, the seeds, collected in the hospital yard, were boiled in milk (water would doubtless have done just as well), the cotyledons and investing shell were then carefully removed, and the seeds were then again twice successively boiled. To a drachm of the seeds thus prepared, were added two drachms of powdered catechu, and a few drops of oil of peppermint, and the mass so obtained was divided into two-grain pills. This is simply a modification of the process first advised by Dr. D. White in 1813 (Ainslie, Mat. Med. of Hind. p. 292), and from the use of these pills, in some hundreds of cases, I can testify both to their safety and to their efficiency. Any excessive action, which however was rarely observed, was almost immediately checked by a draught of fresh lime-juice. My own trials with them were confined to natives (Burmese); but Dr. T. Marshall, Bombay Medical Service, employed them on European soldiers, and he states that he found two pills (in each half a grain of the mass), given to a man of ordinary habit and undebilitated frame, produce a full purgation. He estimates this dose as equal in power to half a drachm of jalap (as it comes to India), or to six grains of calomel and an ounce of Epsom salts.

Next in potency of action stand the seeds of the English Physic Nut, *Curcas purgans*, Adans., a common shrub in the tropical and warmer portions of both hemispheres. They are somewhat of the shape of croton seeds, but much larger, of a black colour, rough to the touch, and marked with minute cracks. That, in their crude state, they possess active acrid properties is evident from the following case, recorded by Dr. Marrett (Madras Med. Journ., July, 1861, p. 37), in which from fifteen to twenty of the seeds were swallowed. Within an hour and a half after ingestion, burning sensations in the throat and stomach commenced, followed by profuse purging, vomiting, violent cramps of the extremities, which subsequently extended to the muscles of the abdomen and back, and occasional twitchings of those of the back almost like those observed in tetanus. This was followed by deafness, and, although the patient seemed all the time to be quite sensible, he failed on recovery, which occurred after two days of intense suffering, to recall any of the events of his illness subsequent to the occurrence of the purging, which was one of the earliest symptoms. Dr. G. Bennett ('Gatherings of a Naturalist in Australasia,' p. 402) furnishes some interesting information regarding the use of these seeds amongst the people of the Philippine Islands. His informant, a native doctor, described them as being an excellent and mild purgative, and he gave them in doses from one to four (seldom exceeding the latter number), according to the age or strength of the patient; one for the age of three or four years, two at ten or twelve, three at fifteen or eighteen years, and four as a full dose for an adult. When administered, the kernels are extracted from their shells, and sometimes given in that form; but usually they are pounded in a mortar with water, and, after being well incorporated, the emulsion, strained, is given as a draught to the patient. It operates a few hours after it has been taken, and is regarded as an excellent aperient. Dr. Bennett's own experience with them, however, is not so favourable. He states that he occasionally administered them, but always found their effects very irregular, some requiring a dose of from six to eight seeds, others only the usual dose of four; but in all an uneasy burning sensation in the bowels, with nausea and vomiting, followed. This uncertainty in operation corresponds exactly with the observations of Professor Christison ('Dispensatory,' p. 794) on the use of the expressed oil of these seeds, of which they yield from 25 to 30 per cent. One sample from Barbadoes seeds acted precisely like castor oil in doses of 10 to 20 drops, whilst that from Jamaica seeds caused, in some cases, the same severe sickness and watery evacuations, as croton oil, and in others was inert in doses of 30 drops. This want of uniformity in action would preclude its employment in practice.

One circumstance regarding this seed remains to be noticed. Professor Christison observed that the marc or residuum left after the expression of the oil from the bruised seeds, retained active properties, a dose of a few grains occasioning violent purging and vomiting. I shall have occasion to notice this fact hereafter.

Equal, if not superior, in potency is our next article, the seeds of *Curcas multifidus*, Endl., commonly known as French Physic Nuts. The seeds, observes Dr. Lindley (Flor. Med., p. 185), are one of the best of all emetics and purgatives, acting briskly but without inconvenience. With all due respect to so high an authority, I beg leave to doubt this; as far as I am aware, there is no reliable evidence of their being either safe or effectual. I once fell in with a case of poisoning by them, in the person of a young man, a Hindoo, who had swallowed three or four of the fresh seeds. Violent purging and vomiting, intense heat and pain in the stomach, with great prostration of the vital powers, were the principal symptoms. Recovery took place under the plentiful administration of lime-juice and stimulants.

Next in power, we may mention the seeds of *Euphorbia Lathyris*, Linn., the Caper Spurge, a European plant. They possess additional interest as evidencing that, in our cold northern climate, the seeds of Euphorbiaceous plants possess all the active properties of their tropical congeners. The seeds, about the size of a peppercorn, are at first sweetish to the taste, but soon impress a sensation of acridity on the fauces. When swallowed, they cause a sensation of burning throughout the mouth, œsophagus, and stomach, and, if swallowed to the extent of six or twelve, they operate as a violent emetico-cathartic. Their expressed oil was first introduced into practice by Dr. Calderini, who stated that in doses from 6 to 8 drops it acted efficiently and safely as a purgative, without causing nausea or colic; but subsequent trials with it at the Clinique at Bologna, and elsewhere, tended to show that it is very uncertain in its operation, which is a great objection to any medicine, but especially to a purgative.

It is worthy of note that the capsules, which, in the fresh state, are undoubtedly acrid and poisonous, become innocuous by undergoing the process of pickling, and that they are used as a substitute for capers, which they resemble in size, appearance, and pungency. Dr. Pereira, however, justly observes (vol. ii. pt. i. p. 1271) that the free use of the pickled fruit may be dangerous.

The next article in our list is the *Hura crepitans*, Linn., the sand-box tree of the West Indies. Our knowledge of the properties of its seeds is comparatively small; still we know sufficient to warrant the assertion that they possess irritant properties, very analogous to the foregoing. Mr. A. Robinson, of Jamaica, we are informed by Lunan (Hort. Jamaic. vol. ii. p. 139), after eating a single fresh seed, became, in the space of five or six minutes, very sick, and was purged, and vomited violently. When chewed, they cause, according to the same authority, great heat in the mouth and fauces. A circumstance which appears to modify their action is the length of time they have been collected. When old and dry, they lose the greater part, if not the whole of their acridity; and Dr. Hamilton (Pharm. Journ. vol. ix. p. 13) informs us that in this state he has eaten several of them with perfect impunity. Another circumstance which modifies their action will be mentioned hereafter. They yield by expression a purgative oil, but we know little of it beyond the fact.

Coming to the milder Euphorbiaceous purgative seeds, we will notice first those of *Anda Gomesii*, Juss., a tree of Brazil. From time immemorial they have enjoyed a high repute amongst the Brazilians as a purgative. Piso (Hist. Nat. Bras., ed. 1648, p. 110) speaks of two seeds being the proper dose for an adult; but Martius (Mat. Med. Bras. p. 83) states that one is sufficient. By expression they yield a clear pale yellow oil, nearly destitute of odour and taste, with which Dr. Norris made some trials in the Pennsylvanian Hospital, and found that in doses of 50 drops it acted moderately on the bowels (Amer. Cyc. of Pract. Med. 1834, vol. i. p. 470). Subsequent trials with it in England by Mr. Ure (Pharm. Journ., vol. ix. p. 9) confirmed Dr. Norris's statements as to its safety and efficacy; but he found it rarely necessary to carry the dose beyond 20 drops. Commenting on the cases in which he employed it, he remarks that it offered nothing unpleasant to the taste, produced none of the heat in the throat which croton oil creates, and seldom occasioned nausea or griping. St. Hilaire (Plant. Usuel. de Brésil, t. 54–5), who furnishes excellent figures of the plant and fruit, cites a passage from a paper by Gomes (from whom the plant derives its specific name) with reference to these seeds, which, on the whole, is in accordance with the above statements; but, from having witnessed the ingestion of two or three of these seeds followed by abdominal pain, etc., he draws the conclusion that, to be employed with safety, they should be perfectly ripe, dry, and well bruised. With these precautions, he adds, they will be found a safe and agreeable remedy.

We now come to the best-known and most valuable of the group, *Ricinus communis*, Linn., the Castor Oil Plant, which extends from Southern Europe throughout the tropical regions of the globe. The purgative nature of the seeds and their expressed oil was known to Dioscorides, who flourished about 50 B.C.; and from that time to the present, nearly 1900 years, castor oil has maintained a high place in the ranks of officinal purgatives. The seeds in their crude state, especially when recently collected, possess considerable acridity, two or three of them being sufficient to induce purgation. Orfila quotes a passage from Bergius, in which a single seed produced violent vomiting and purging; and Dr. A. Taylor mentions the case of two sisters, who took each from two to four seeds, and suffered severely in the same way, whilst another sister, who swallowed as many as twenty seeds, died in five days with all the symptoms of malignant cholera. Climate, however, appears materially to affect their activity; and Professor Christison ('On Poisons,' p. 590) states that he has known a person eat, without any ill effects, several seeds ripened in the open air in the neighbourhood of Edinburgh. They been have occasionally employed medicinally. M. Mialhe (Bull. de Thérap. xxv. p. 42) found an emulsion containing from 3 to $7\frac{1}{2}$ grains of the seeds act as an agreeable and efficient aperient, its action being unattended with nausea or vomiting. Testimony to a similar effect is borne by Dr. Cazin (Plant. Med. Indig., p. 824). The water distilled from the seeds is stated by Mr. Scattergood (Amer. Journ. of Pharm. xxviii. p. 207) to act as a purgative in doses of half an ounce, and as an emetic in double that quantity. An ethereal and alcoholic tincture of the seeds, having four times the strength of ordinary castor oil, has been proposed by M. Parola, but it has found few advocates amongst us.

The best castor oil in general use in this country, as you are doubtless aware, is obtained by simple expression, and the proportion obtained by this process is estimated by Geiger at about 42 per cent. Pressure, however, fails to extract the whole of the active principle of the seeds. The following experiments of M. Callond (Pharm. Journ. 1849, vol. viii. p. 491) on this point are equally interesting and important. 1. After having expressed the oil from the seeds by a powerful pressure, the marc was treated with pure alcohol, and the filtered liquor submitted to spontaneous evaporation. The oily residue was found to have the same action as the expressed oil. 2. After having exhausted the seeds of everything soluble by boiling alcohol, the residual marc, when administered to the extent of 7 or 8 grains in a glass of sweetened water, produced nausea and salivation, which lasted more than six hours; 30 grains adminstered in two doses to a strong young man, caused vomiting accompanied by much straining for nearly twenty-four hours. Analogous facts were noticed by M. Parola, with respect to the residuum left after the preparation of his ethereal tincture.

The castor oil usually sold in the bazaars or native shops, both in the East and West Indies, is prepared wholly or partially by coction. It is browner, thicker, and more nauseous than "the cold-drawn oil," and if not more actively purgative, as it however generally is, it is far more acrid, causing more griping, nausea, and vomiting. By some this has been attributed to an admixture of *Jatropha* or croton seeds with the castor oil-seeds; but, in my opinion, it is rather due to the heat employed, imparting to the fixed oil greater solvent power over the resinous principle of the seed, to which point I shall subsequently call your attention.

The next individual in our list is *Aleurites triloba*, Forst., a large tree of the Polynesian islands, now naturalized in India, especially at Belgaum,—hence its Anglo-Indian name, Belgaum Walnut. As far as is known, the kernels, even in the fresh state, are devoid of any active or acrid properties; indeed, according to Dr. G. Bennett, they constitute in New Georgia an article of diet. Dr. O'Rorke (Ann. de Thérap. 1859, p. 117) has called attention to their expressed oil, of which they yield upwards of 50 per cent., as an aperient. He states that in doses of 1 to 2 ounces it acts as a very mild and safe purgative, producing in from three to six hours after ingestion, free bilious-coloured stools, unattended by either colic, nausea, or other ill effects. His estimate of it is very high; he considers that it approaches nearly to castor oil in mildness and certainty of operation, but is superior as possessing greater fluidity, as having neither taste nor smell, and as producing its purgative action without any concomitant nausea, whether administered in emulsion or in a pure state. It is to be hoped that further trials will be instituted with it.

We have now arrived at our last article, *Omphalea triandra*, Linn., a tree of the West Indies, which need detain us here but one minute. The kernels are stated to be delicately sweet and wholesome, whilst the oil expressed from them is represented as sweet, well-flavoured, and, as far as it has been tried in medicinal doses up to two ounces, devoid of any active properties. My reason for including this article in my list will appear hereafter.

The doses and relative potency of Euphorbiaceous seed-oils have recently been examined by Dr. O'Rorke, especially with reference to the oil of *Aleurites triloba*, mentioned above. He has classified them as follows:—

Emetico-cathartic Oils.

Oil of *Croton Tiglium*	1–2 drops.
Oil of *Curcas purgans*	8–12 ,,
Oil of *Euphorbia Lathyris*	15–30 ,,
Oil of *Anda Gomesii*	30–45 ,,
Oil of *Hura crepitans*	75–150 ,,
Oil of *Ricinus communis*	1–2 ounces.

Simply Purgative Oil.

Oil of *Aleurites triloba*	1–2 ounces.

Inert Oil.

Oil of *Omphalea triandra*	1–2 ounces.

To this arrangement no exception can be taken; not so to some of the doses, which are generally too large; thus, one ounce is too large for the minimum dose of castor oil. With regard to the oil of *E. Lathyris* gutt. viij seems to be the maximum dose, indeed MM. Lupis and Canella consider that gutt. v should never be exceeded; and with respect to the oil of *Anda Gomesii* M. Ure found gutt. xx act efficiently as a purgative in ordinary cases.

We may now proceed to the consideration of the active principle of these seeds, at least of those included by Dr. O'Rorke in his class emetico-cathartics. Looking at the fact that each of these seeds yields, on expression, a fixed oil, which taken internally produces, in certain degrees, purgative and emetic effects, —we might, taking a superficial view of the subject, be inclined, in answer to the question, what is their active principle? to reply at once, the fixed oil which they respectively contain. Such an answer would, it appears to me, be erroneous, or at any rate would not embrace the truth, the whole truth, and nothing but the truth. The facts on which this opinion is based are twofold. First, the violence of the operation observable in the use of these seeds when taken internally, is wholly out of proportion to the amount of oil which is known to exist in them, and to the influence which, when extracted by pressure or otherwise, it exercises on the system. Secondly, the fact that after the fixed oil has been extracted by powerful pressure and by the subsequent action of ether and alcohol, the marc or residuum retains the same activity which the seeds possessed previous to their being subject to these exhausting agencies.

In support of the first reason, let me recall to your memory one or two facts already mentioned. Take castor-oil seeds for example: look at Dr. Taylor's case, in which twenty of these seeds proved fatal to an adult. I find the average weight of these seeds to be between six and seven grains, so we may conclude that about two drachms weight of the seeds in this instance were swallowed. This quantity, if submitted to pressure, would probably yield a drachm, or at the outside a drachm and a half of the fixed oil; a quantity which we all know may, under ordinary circumstances, be given to a young child with perfect impunity. Again, M. Mialhe and Dr. Cazin agree in stating that an emulsion containing from $3\frac{1}{2}$ to 7 grains of castor-oil seeds acts as an agreeable and efficient purgative. Now the amount of oil contained in such a quantity is almost homœopathically small, only three or four drops at the outside, a quantity which, if obtained by expression or by the agency of alcohol, would be wholly inoperative, even on an infant.

The same fact is illustrated by death following the ingestion of a single croton seed, as related by Dr. Wallich; surely the amount of oil contained in one seed is wholly inadequate to account for such a result.

This train of thought receives additional weight from the fact, that after the fixed oil has been extracted by powerful pressure, and by the subsequent action of ether and alcohol, the residuum taken internally is capable of producing a train of symptoms analogous to, and very nearly as powerful as those caused by the crude seeds before they have been subjected to any of these exhausting agencies. This, it will be remembered, has been shown to be the case with regard to castor-oil seeds, by M. Callond and M. Parola, and with regard to English Physic Nuts, by Professor Christison, and a similar state of things is drawn inferentially with regard to croton seeds.

If asked then in what light I regard this fixed oil, I reply that I regard it as a bland oil, holding the active principle in solution. So far from regarding it itself as the active principle, I regard it rather as a safeguard against the too violent operation of the active principle, acting mechanically by protecting the mucous intestinal surface from the immediate or too irritant contact of the acrid active principle,—a mechanical antidote in fact provided by nature; a mode of proceeding which we often unconsciously imitate when we prescribe oleaginous fluids in cases of irritant poisoning.

The question then naturally arises, what is the active principle of these seeds? for, be it what it may, it is evident that it is the same or nearly so, judging from the physiological effect produced by each, namely, burning sensations in the fauces, œsophagus, and stomach; more or less purging, vomiting, and colic; in severe cases, collapse followed by fatal results; dissection disclosing an inflamed state of the intestinal canal,—all evidences of the action of an acrid poison. So imperfect are the analyses we possess of these seeds, even of the best known of them, as croton and castor seeds, that it behoves us to speak on this point with much caution; but it appears probable that the "brownish-yellow resin" found by Brandes in croton seeds; the "acrid principle, probably resinous," detected by Souberain (Journ. de Pharm. 1829, vol. xv. p. 507) in castor seeds; the "peculiar fixed acrid resin," detected by the same chemist in the seeds of English Physic Nut, and also the "brown acrid oil" and the "brown resin," which he found in the seeds of *Euphorbia Lathyris*, are but modifications of, or rather different modes of describing, an acrid resinous principle common alike to all these seeds, and on which, in all probability, their activity depends. It is sincerely to be hoped that this group of seeds may soon undergo a full analysis such as they deserve.

That the acrid principle, be it what it may, is volatile, may in a measure be inferred from the statement of Dr. Hamilton with regard to the seeds of *Hura crepitans*. By long keeping they lose the acridity they possess in their fresh state, and a quantity which in this latter state would doubtless have produced serious consequences was, when old and dry, as in Dr. Hamilton's case, taken with impunity. If this holds good, as it probably does, with regard to the other seeds, we may find in it, perhaps, an explanation of the uncertainty in operation which we have mentioned, as having been observed in the use of the fixed oil of the Physic Nut and *Euphorbia Lathyris*, and which has also been sometimes observed in castor and croton oil. To be uniformly active, it is necessary that the oil should be extracted from the freshly-gathered seeds.

The next point for consideration, and that a very interesting one, is the seat of the acrid principle: here opinions differ, some asserting that it lies wholly or mainly in the cotyledon, whilst others maintain that no more acridity exists in the cotyledon than in the albumen or nucleus. It would be far beyond my limits to enter into the particulars of this controversy. I shall therefore content myself with mentioning the facts which have induced me to come to the conclusion, that in some of these seeds, and, reasoning by analogy, probably in all, the cotyledon is essentially the seat of the acrid principle.

First, then, a few words with reference to the seeds of *Curcas purgans*, the English Physic Nut. You may recall to your mind Dr. Bennett's statements relative to the effect observed by him in his own practice: in all there was a burning sensation in the bowels, attended with nausea, vomiting, and purging. You may also remember, which is perhaps more to the point, the serious and wellnigh fatal effects induced by the ingestion of twenty of these seeds, in Dr. Marrett's case. In juxtaposition with these statements I will ask you to consider another, made on the authority of our distinguished Indian botanist, Dr. R. Wight, to the effect that he has repeatedly eaten considerable numbers of these seeds, *care having been taken previously to remove the cotyledon in each*, and that after so doing he never experienced the slightest inconvenience of any kind! The innocuous nature and pleasant taste of these seeds, after the removal of the cotyledon, was, according to popular tradition, first brought to notice by a Dr. Spratt, hence, to the present day, they are popularly known in Madras by the name of Jack Spratt nuts! How can we reconcile these opposed statements, excepting by the hypothesis that the acridity of the seeds resides in the cotyledon? This is in accordance with the experience of Dr. Bennett cited above, who remarks, that while the albumen seems innocuous, the embryo is highly active.

Ainslie (Mat. Ind. vol. ii. p. 46) is of opinion that the chief seat of acridity in these seeds and in croton seeds likewise, is the investing membrane, or endocarp. I am unaware of any recorded facts which tend to support or to disprove this idea; how far it may partake of the acridity of the embryo, I know not.

Now turn to another seed, that of *Hura crepitans*, the acrid emetico-cathartic properties of which we but just now noticed; yet Dr. Hamilton (op. cit.) informs us that he knew an American captain who was in the habit of constantly carrying about with him some of these kernels, *with the cotyledon carefully removed*, and of these he took four or five in the morning to relieve the bowels, which they did without causing sickness, pain, or griping. This statement receives support from some experiments with these seeds made by M. Thierry, of Paris, from which he draws the conclusion that the cotyledon is the sole seat of the acrid emetic properties of the seed. (See Merat et De Lens, Dict. Mat. Med. Art. Hura.)

Look, again, at the seeds of *Omphalea triandra*, the Hog-nut of Jamaica, delicately sweet and wholesome, yielding a bland inert oil; yet we have the authority of Lunan, a most disinterested witness, for the statement that the cotyledon operates both as a purgative and emetic. A similar fact is noticed by Aublet (Plant. Guian. ii. p. 845) with regard to the kernels of *O. diandra*, a tree of French Guiana. He describes it as pleasantly tasted and wholesome, but adds, that to those who have eaten them without the precaution of removing the cotyledon they prove purgative.

Such are some of the reasons, and you must admit that they possess much force, which have impressed me with the belief that the cotyledon is the chief seat of acridity in these and probably in all euphorbiaceous seeds.

Lastly, Gentlemen, one word as to the antidotal powers of fresh lime or lemon-juice in poisoning by the euphorbiaceous seeds. Its use I first learnt from the Burmese, or from Mr. Mason's work on Burmah, but be that as it may, I have known many cases, both in my own practice and in that of others (where it had been used by my advice), in which excessive action of croton seeds has been speedily and completely relieved by the free use of lime juice. In one case of poisoning by the seeds of the French Physic Nut (*Curcas multifida*), and in three cases of poisoning by the fresh root of *Manihot utilissima* (a Euphorbiaceous plant) I have relied mainly on this remedy, and although stimulants were resorted to at the same time, to combat the symptoms of collapse, yet it has in each case appeared to me, that the relief of symptoms and eventual recovery were due to the lime juice, which was given with no unsparing hand. Other vegetable acids will perhaps answer equally well, if we may judge by the power of vinegar to deprive the fruit of *E. Lathyris* of their acrid properties, and to convert them into an innocuous condiment. Of the powers of lime juice I can speak with some confidence, and I commend it to your notice. The rationale of its action I do not attempt to explain, but in its powers as an antidote in poisoning by the *Euphorbiaceæ* I have great faith.

The PRESIDENT remarked that, as that was the last evening meeting of the session, he was quite sure he only expressed the wishes of those present when he said that their thanks were particularly due to all those who had read papers at the evening meetings during the last session. He trusted that next year they might all meet again, and with a considerable increase in their numbers.

PHARMACEUTICAL SOCIETY, EDINBURGH.

A meeting of this Society was held in St. George's Hall, on Tuesday evening, the 3rd of April; Mr. KEMP, President, in the chair.

Mr. John Mackay brought before the meeting a new method of preserving beef, mutton, and other animal substances used for food in a perfectly fresh condition, free from salt or any other ingredient likely to interfere with the flavour or condition of the material so preserved. Mr. Mackay stated that the discovery of the process about to be submitted was due to Dr. Redwood, who in the course of last summer commenced a series of experiments with paraffin, in, of course, a state of purity. The following peculiarities of this substance were referred to, viz. its solidity, whiteness, tastelessness, and entire freedom from smell. At a heat of about 130° it becomes fluid, and will, in this condition, bear a considerable amount of heat without boiling, and thus enables the experimenter to raise the temperature, if required, several hundred degrees above 212°, the boiling-point of water, without in any respect altering its condition. It was found that animal substances, when immersed in a bath of paraffin heated to about 250° F., rapidly lost the air and water which all such substances contain, leaving the juice of the meat in a concentrated state. Mr. Mackay explained how this was done. According to the thickness of the mass of meat the time of its immersion is increased or diminished. By this process the germs of destruction are found to be quite destroyed, very much on the same principle that the various articles of food are prepared in hermetically sealed vessels, or calf-foot jelly bottled and kept in a perfect state of preservation. When the meat has thus been allowed to remain a sufficient length of time in the highly-heated paraffin, it is removed, and immediately dipped into a bath containing the same material, at a lower temperature, and after two or three dippings the process is complete, and the substances thus preserved are ready either for home or foreign consumption. Already various samples have been prepared, and, after three months' keeping, have been cooked and found perfectly sweet, and free from any taint whatever. So successful has the process been, so far as it has been tried, in connection with experiments commenced last summer, that a company has been formed in London, under the name of "Redwood's Patents Company, Limited," where experiments are still going on with a great variety of different substances—such as bacon, beef, mutton, butter, eggs, sausages, cheese, hams, etc. The company, having secured patent rights on the Continent and in South America, hope that ere long, choice beef and mutton will be sent home to Great Britain in a perfectly fresh state, and be sold at such prices as must of necessity prove a boon to the public generally, but more especially to the poorer portion of the inhabitants in this country. Mr. Mackay submitted to the meeting several specimens of meat prepared by the new process, including a jigot of mutton and several chops. These looked very beautiful, resembling in appearance the purest alabaster, and, though handled a good deal, remained unchanged. Some of the samples shown had been prepared five weeks, and Mr. Mackay stated that one cooked a few days previously was perfectly sweet and fresh. The following are the directions by which the preserved meat may be cooked:—"Remove the greater part of the paraffin by breaking it with a hammer or other suitable instrument, and peeling it off; then put the meat into a vessel of boiling water, when the remainder of the paraffin will melt and rise to the surface, leaving the meat entirely free from it. When it has cooled, the hardened paraffin may be taken from the surface of the water, and the meat dried with a cloth. It is now ready to be prepared for food by any of the usual methods, but it should be cooked for only half the time required for unpreserved fresh meat. The paraffin that has been removed from the meat may be kept for subsequent use, being quite unchanged or injured in any way." In closing his remarks, Mr. M. mentioned that further experiments were being vigorously carried forward at the works of the company, near London, which, if successful, would be the means of bringing the process into very general use.

Thanks were voted to Mr. Mackay for his interesting paper.

Dr. S. Macadam made a communication on chemical philosophy. In the course of his remarks he stated that, as most chemists knew, there were several very important changes about to be effected in the atomic nomenclature, and that such alterations would certainly be adopted in all forthcoming chemical works. The new doctrine might be called that of substitution, because, by removing one atom of a substance and replacing it with another, some very singular and important results followed. Dr. Macadam also mentioned that the new system was really very much the same which, during the lifetime of the eminent chemist Dalton, was attempted to be introduced, and might therefore, with all truthfulness, be termed "Daltonian." The subject was fully illustrated by interesting coloured diagrams.

The President moved a vote of thanks to Dr. Macadam, which was received with acclamation.

The last scientific meeting for the present session was held in St. George's Hall, Edinburgh, on Thursday, the 12th of April; Mr. Kemp, President, in the chair.

Professor Archer, of the Industrial Museum, read a paper on the "Farinaceous Matters and Starches shown in the Exhibition of 1862." The object of the paper was to show how very wide a field was open for the production of amylaceous materials either for food or manufacturing purposes, and it was illustrated by a series of fifty-two specimens, being only a portion of those collected by the writer. The first series was from Trinidad, and consisted of ordinary arrowroot from Maranta, arrowroot of excellent quality, resembling the Tous-les-mois, or more probably Tulema, from a species of *Canna;* tapioca from the *Jatropha Manihot*, and fine Cassava from its variety *flexuosa;* starch for manufacturing purposes from two species of yam, and from the sweet potato, *Batatas edulis;* good arrowroot, from the rootstocks of *Caladium esculentum*, the eddoes of the West Indians, a nourishing meal from the plantain and from the breadfruit. From British Guiana, two starches of commercial value from the seeds of the greenheart-tree (*Nectandra Rodiœi*), and of the mora, a large timber-tree (*Mora excelsa*); also a curious variety of sago from the pith of the Bacuba palm (*Œnocarpus Bacaba*). From Brazil, an extensive series, all prepared by Senhor Theodore Peckbolt, of Rio de Janeiro; those of chief value were from the roots of *Andira* sp.?, *Mirabilis dichotoma*, *Dioscorea piperifolia* and its variety *triangularis*, *D. bulbifera* and *D. Brasiliensis*, *Rajania Brasiliensis*, *Ipomœa operculata*, the sweet potato, and the most important of all, the varieties of tapioca, mandioca, cassava, and cariman, all made from *Jatropha Manihot;* from the rootstocks of *Caladium sagittarium*, *Colocasia antiquorum* and other species, and *Alpinia aromatica;* and from the seeds of *Cipura fluminensis*, *Botryopsis cinerascens*, *Mucuna* sp., *Trianospermum ficifolium*. The starches of Jamaica, all well prepared, were, besides the common arrowroot, Tous-les-mois and varieties of tapioca; from the roots of several species of yam, sweet potato, *Ipomœa Horsfalliæ*, *Scilla maritima* (cultivated), *Echites suberecta*, and *Thunbergia grandiflora;* from the rootstocks of *Arum Colocasia*, the "coco" of the natives, and the fruit of *Colocasia esculenta*, also called "coco;" and from the seeds of *Laurus Persea*, *Sorghum vulgare*, the mango and pumpkin, and from the breadfruit. Some of these were shown to be more curious than useful; but the value of many others to our manufactures and as articles of diet was pointed out.

The Chairman then delivered his

VALEDICTORY ADDRESS.

Gentlemen,—Having now arrived at the close of another session, you will probably expect from me a few concluding observations on the business which has engaged our attention, the manner in which it has been done, and any other matters relating to pharmacy or the Pharmaceutical Society which seem to deserve a passing notice. In endeavouring to discharge this duty, it will be my object to make my remarks as brief as possible.

While, on the one hand, there is perhaps some cause for regret on account of the fewness of our meetings, there is, on the other, cause for congratulation on account of the importance of the subjects brought before us, and the numerous attendance of members and visitors on each occasion.

I am sure I just express what we all feel, when I say that we are under special obligations to Dr. Scoresby Jackson for his admirable opening address, in the course of which he ably pointed out to assistants and apprentices the importance of study, the kind of studies necessary to a right knowledge of the business, and the manner in which those studies ought to be pursued; and also to principals, the responsible position they occupy in relation to the medical profession and the public: an address which was published *in extenso* in the December number of the 'Pharmaceutical Journal,' and which I heartily commend to the attention of pharmaceutists generally. We have also been much indebted to Dr. Stevenson Macadam for his able assistance at our scientific meetings, and other substantial proofs of his interest in the Society. Although at the time suffering under a heavy and sudden bereavement, he was kind enough to send for our November meeting two papers on Pharaoh's Serpents, one of which was read by Mr. Mackay and the other by Mr. Hopwood, calling attention to the poisonous nature of the ingredients, and giving an account of a variety of interesting experiments on some of the lower animals, for the purpose of testing the strength and physiological effects of the poison, the result of which clearly proved its power to destroy life.

As the papers were published just at the time when the rage for the serpents was at its height, I believe they served as a note of warning to the public against them, and thus helped to prevent the indiscriminate sale of a really dangerous poison. In addition to these, Dr. Macadam gave us at our last meeting a highly-instructive address on Chemical Philosophy, in the course of which he explained the composition of various important bodies, the theory of chemical types, and the law of substitution, with illustrations of the new method of expressing the various changes which result from its operation,—and thus greatly simplified what to many appears a very difficult and complicated subject. Our thanks are due to Messrs. Morson and Son for specimens of the seed, cake, and oil of the *Argemone Mexicana*, presented to the museum, and exhibited at our first meeting; on which occasion Dr. Argyll Robertson made some observations on the resin of that substance, which, he informed us, is much used by the native oculists of India, as a local application in cases of external inflammation of the eye. He also, at our second meeting, kindly exhibited and explained the construction and mode of using a new and ingenious instrument for the removal of blood, which is much employed on the Continent as a substitute for leeches.

Mr. Mackay, our respected Secretary, also deserves our best acknowledgments, not only for his zeal in the interests of the Society, his efforts to obtain for our meetings the services of gentlemen able and willing to address us on suitable subjects, but also for the very efficient assistance he has given us this session in the form of communications on matters of public importance—on Mr. G. F. Ansell's proposed method for detecting the presence of explosive and other gases in mines, with a simple form of apparatus in operation; on Bowditch's Patent Carburetter; and also on Redwood's mode of preserving meat and other animal substances used for food, specimens of which in a state of preservation he exhibited to the meeting. The importance of these subjects becomes evident when we consider the objects sought to be attained—the saving of human life, the improvement and economizing of our gaslight, and the cheapening of one of the chief necessaries of life; objects which, it is to be hoped, will ere long be fully realized. In Mr. Mackay's readiness to bring before the Society anything new and interesting which comes under his notice, we have an example deserving of imitation by others. While we are, no doubt, anxious to enlist the sympathy and assistance of professional men, and have a preference for scientific subjects, still it is evident that there is a broad margin for subjects of a practical kind, in regard to which, it is well known, many of our members have extensive experience, and are well qualified to speak,—such, for example, as new and improved apparatus and processes for the manufacture of chemical or pharmaceutical compounds, new sources or applications of drugs, adulterations, tests, etc.

Remarks or short papers on these or similar topics would be highly useful and attractive.

It is, therefore, to be hoped that many of our members will take the hint, and begin now to prepare to give us a helping hand next session.

I am glad to say that we have the immediate prospect of a new and revised edition of the 'British Pharmacopœia,' in which it is expected that several of the old and familiar preparations omitted from the first edition will be replaced; that the materia medica and the compounds will be arranged together, as formerly; and that there will be either a posological table or the doses given along with the descriptions and formulæ of the various substances. Whether such arrangements and alterations be strictly in accordance with the nature and objects of a pharmacopœia or not, it cannot be doubted that they will be very convenient, both to prescribers and dispensers.

The subject of electoral reform has been absorbing so much of the attention of the Government and the country, that there is now little probability of a bill relating to pharmacy being brought before Parliament this session; and, so far as appearances go, the question will very likely remain for some time in the condition in which it was left by the Select Committee. The policy of the Council in London will, therefore, probably be—in the meantime, at least—to wait and watch the action of Government in the matter, and, at the proper time, endeavour to guide it to a satisfactory result.

Having already referred to valuable the services of those who favoured us with communications at our former meetings, I now, with much pleasure, acknowledge our obligations to Professor Archer on many occasions, and particularly for the excellent address he has just given us, "On a Series of Farinaceous Materials and Starches collected in the Exhibition of 1862," and for his readiness, not only to show us from time to time some of the vast stores of natural and artificial productions at his command, but to share with us the extensive knowledge he has accumulated regarding them.

On the whole, then, Gentlemen, I think it is evident, that if we have not had a long session, we have at least had a useful one, and that the work undertaken has been well done.

As you are aware, it is customary for the President to offer a prize for the best essay on any chemical or pharmaceutical subject; but as the offer made at the beginning of the session has not been taken advantage of, it has been thought advisable to extend the time allowed for the reception of essays, and to request parties desirous of competing for this prize to send in their papers to the Secretary not later than the 1st of November next.

I have now, in conclusion, only to thank you all for your attendance at the meetings, and for the kind consideration and assistance I have received while humbly endeavouring to serve the Society and to discharge the duties of the chair.

THE ANNUAL MEETING.

The Annual Meeting was held in the Café Royal on Friday evening, 13th April, at a quarter past 8 o'clock; Mr. Kemp, President, in the chair.

After a few introductory remarks, the Chairman requested the Secretary to read

THE ANNUAL REPORT.

The Council beg now to submit, at this, the Annual Meeting of the Society, their usual report as to the position and progress of the Association during the past year.

The scientific meetings have been four in number, and very fairly attended. The difficulty in getting up these meetings still exists, a circumstance which causes much regret to the Council. They believe it only requires a little effort on the part of some connected with the Society, to increase at once the number and the interest of such assemblings during the winter session; and while thanks are tendered to those who have so kindly assisted, the Council express a hope that the meetings of next session may be more numerous than during the one which has just closed.

No essays have been lodged this year, either in competition for the President's or the Register Fund Prize. This is much to be regretted, and the Council have now to intimate, that the President has kindly agreed to extend the time formerly given, and will still award his prize to the author of the best essay on any chemical or pharmaceutical subject, which may be sent for competition to the Secretary not later than 1st November of the present year. Those, therefore, who may have a desire to compete will have plenty of time during the summer months to prepare and forward their communications.

The library is now in a greater state of efficiency than ever, and, as full catalogues have been recently printed, it is hoped that additional use may be taken of this important branch of the Society's operations here. Volumes are still being added from time to time, while there are a few weekly and monthly publications regularly supplied. The Librarian will be glad to supply catalogues and give any information which may be equired.

The Council have had under consideration, more than once, the desirableness of making arrangements by which the pupils and associates of the Society might advantageously attend courses of lectures on materia medica, pharmacy, and chemistry. Arrangements are not yet completed, but they hope ere long to give such opportunities as will doubtless be taken advantage of, by all who can spare the time, to attend these courses.

The Board of Examiners have met in Edinburgh four times during the past year, and and it gives the Council much pleasure to be able to announce that the interest in these examinations is very much increased. At the last meeting five parties passed their examinations, and were recommended for admission to the Society.

The following is a statement of accounts for the year 1865:—

John Mackay in account with the Pharmaceutical Society, from 1st January to 31st December, 1865.

Dr.		£.	*s.*	*d.*	*Cr.*		£.	*s.*	*d.*
1865.					1865.				
June 10.	Cash	51	0	0		Postage Stamps	2	5	6
Dec. 31.	Balance due to Secretary	19	6	11		Meetings, Door-Keeper, etc.	1	0	11
						Expenses of Annual Meeting	7	2	0
						Fire Insurance	0	6	2
						One Year's Rent of Hall and Museum Room	30	0	0
						W. Hill, Curator of Library and Museum	5	0	0
						Painting	0	8	0
						Paid Messenger for Petition	1	5	0
						Repairs on Museum Account	1	8	3
						Envelopes, Porterage, etc.	1	1	0
						Books and Publications for Library, including New Catalogue for ditto, Billets, etc.	20	10	1
		£70	6	11			£70	6	11

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, 1865, nineteen pounds six shillings and eleven pence sterling.

David Kemp.
D. R. Brown.
Edinburgh, 10th April, 1866. J. R. Young.

It is well known that the exertions of the Society, in reference to an amended Pharmacy Bill, during the last session of Parliament, were unsuccessful. Such a press of business came before the House of Commons, previous to the dissolution, that, although a Select Committee had the whole matter under consideration, they were unable so to report as to enable any measure to be prepared. It is, however, very satisfactory to know that, judging from the intercourse which took place with many influential parties during the time the proposed measure was before Parliament, as well as from more than one interview with Government officials, all were very favourably impressed with the position, usefulness, standing, and high character of the Pharmaceutical Society. At present, although there is no bill under consideration, the Society is neither slumbering nor careless; they are not only watching any step which may be taken, but are also quite prepared to take action if required, or to give such assistance as may enable the Legislature to enact a measure which will be so comprehensive in its details as to include all existing chemists and druggists, and at the same time, from its provisions, give satisfaction and confidence to the public generally. Without expressing any opinion as to the provisions of a future Bill, the Council cannot refrain from indulging the hope that any Act which may be introduced will, as one of its chief features, make it imperative that all who become dispensing chemists, after the passing of such a measure, shall submit to a regular examination, and thus be qualified to compound medical prescriptions with some degree of accuracy and care.

The Council beg to call especial attention to the Benevolent Fund. A glance at the Journal during the past year will show that the operation of the fund has now fairly commenced, and is gradually extending. Sums of money have been granted, and annuities bestowed, in several cases, where, doubtless, such assistance has been highly appreciated. The London Council are especially desirous that this fund should be fairly supported by those connected with the Society, from some of whom a small annual contribution will be gratefully received, which, while it will not impoverish the donor, may and will assist in relieving the necessities and wants of some of their less prosperous brethren. The Council would take this opportunity of reminding both Associates and Members that they have, by voting papers regularly sent in connection with this fund, the privilege of giving their support to such cases as they may think the most deserving,

The Council are much pleased to find from the financial statement, published this month, that there is at length a profit to the Society on the Journal account. The amount is certainly not a large one, although, small as it is, it contrasts very favourably with the heavy expense with which, until lately, the funds of the Society were year after year burdened. Now that the balance is on the credit side, the Council do hope that each financial year will find the sum gradually but steadily increase, until the publication of the Journal becomes a considerable source of profit to the Society. While on this subject, the Council cannot refrain from giving expression to an earnest desire for the increased usefulness of the Journal; and with this view would respectfully, but strongly, urge the necessity for increased vigour in the management of the various departments, in order that the 'Pharmaceutical Journal' may not only maintain, but increase, at once its circulation and celebrity.

Edinburgh, 12*th April*, 1866.

Mr. Conacher, of Markinch, moved the adoption of the Report which had just been read. This was seconded by Mr. Currie, of Glasgow, and carried unanimously.

Mr. Hart, of Glasgow, then moved that the following gentlemen be elected as office-bearers for 1866–67:—

President—Mr. Kemp, Portobello.

Vice-President—Mr. D. R. Brown, of Macfarlan and Co.

Council—President and Vice-President, G. Blanshard, Smith (Kilmarnock), Flockhart, Aitken, Borland, Govan, Noble, Gardner, Ainslie, Stephenson, Raimes, Young, Tait, Baildon (H. C.), Buchanan, and Allan.

Examiners—President, Vice-President, and Messrs. Gardner, Aitken, Ainslie, Tait, Young, Noble, President and Vice-President in London and Secretary in Edinburgh, *ex officiis*.

Secretary—John Mackay.

Curator—Mr. W. Hill.

Library and Museum Committee—President, Vice-President, and Messrs. Ainslie, Young, and Noble.

The meeting with acclamation adopted the list. The President having made a few remarks as to the honour which had been conferred upon him by his re-election, the meeting adjourned.

The business having been disposed of, the members and their friends, to the number of upwards of a hundred, sat down to supper, Mr. David Kemp in the chair; Mr. D. R. Brown and Mr. Blanshard officiating as croupiers. Amongst those present were Professor Archer; Mr. John Currie, Glasgw; Mr. Hugh Hart, Glasgow; Mr. Thomas Moffatt, Glasgow; Dr. Adamos; Mr. David Conacher; Councillor Colston; Dr. Stevenson Macadam; Dr. Argyll Robertson; Mr. William Ainslie; Mr. W. Montgomerie; Mr. James Gardiner; Mr. John Macdonald, Lasswade; Mr. John Nicoll; Mr. J. Buchanan; Mr. James R. Young; Mr. A. Noble; the Messrs. Brown; Mr. John Mackay, etc.

The Chairman read letters of apology from Professor Maclagan; Dr. Scoresby Jackson; Dr. Robertson, of Glasgow; Mr. Bruce Allan; Mr. A. Kininmont, of Glasgow; Mr. Brady, of Newcastle; and Mr. William Cameron, of Kelso.

After the usual loyal and patriotic toasts,

The CHAIRMAN proposed "The Pharmaceutical Society of Great Britain," the object of which, he said, was to introduce into the business of pharmacy the elements of a medical education. The formation of the Society had in the highest degree tended to promote that result. The Society did not interfere in the slightest degree with the legitimate duties of the physician or surgeon, but tended to strengthen the position of both by ensuring an intelligent and safe administration of the remedies prescribed. Since the origin of the Society it had been instrumental in various ways in forwarding the interests of the pharmaceutical profession, and in preventing the adoption of measures which would have been detrimental to their interests. It had also given an opportunity to the heads of the profession from all parts, of meeting in conference for the interchange of opinion, and for taking action together in matters relating to pharmacy. The toast was drunk with all the honours.

The following toasts were then given:—"Pharmaceutical Education," by Mr. D. R. Brown; "Memory of Jacob Bell," by Dr. Stevenson Macadam; "President and Council in London," by Professor Archer, replied to by Mr. Mackay; "The Honorary Members of the Society in Scotland," by Mr. Nicoll, replied to by Dr. S. Macadam; "Professor Archer and the Industrial Museum," by Mr. D. R. Brown, replied to by Professor Archer; "The Royal Colleges of Physicians and Surgeons," by Mr. Young, replied to Dr. Argyll Robertson; "Visitors from a distance," by Mr. Noble, replied to by Mr. Currie, from Glasgow; "Absent Friends," by Mr. Mackay; "The Council in Edinburgh," replied to by the Chairman; "The Assistants and Apprentices," by Mr. Ainslie, replied to by Mr. Hill; "The Chair," by Mr. Blanshard; "The Croupier," by Mr. Currie; "The Secretary," by Mr. Nicoll; "The Union of Pharmaceutists," by Mr. Moffat, of Glasgow. Several excellent songs were sung by Mr. Brown and others, and the party separated much pleased with the evening's entertainment.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

CONVERSAZIONE.

In order to afford an opportunity to the members who are precluded by distance and business calls from attending the general meetings, of assembling, interchanging views, renewing good fellowship, and, at the same time, of enjoying the pleasure of becoming acquainted with many novelties and inventions in chemistry and its kindred branches of science, the Council of the Association determined, with great promptitude, to hold a conversazione on the evening of the 15th of March.

Though the interval between this resolution and the night appointed for the conversazione was very brief to bring together such subjects of interest as would be attractive to the general body of the members as well as to that portion of the intellectual public of Liverpool who are interested in such matters, it did not discourage but rather animated the Council to greater zeal; and the result showed how energetically its several members must have worked to accomplish the task.

This, the ninth conversazione of the Association, was held, as usual, in the Royal Institution, and its several attractive galleries of art, natural history, geology, etc., and also the Museum of the Chemists' Association and of applied science, aided considerably to heighten the enjoyment of the visitors. The weather was anything but alluring, to the ladies especially; still, in very little time after half-past six, a very select company of about 200 ladies and gentlemen assembled, and betook themselves to various rooms and galleries. Microscopic inspection was much patronized; and the wonderful organization and structure of the objects shown under the powerful instruments of Messrs. John Abraham, T. F. Abraham, Laurence Hardman, C. F. Salt, and Joseph Marples, arranged along the geological gallery, merited the favour. The splendid microphotographs of Dr. Maddox, brought within the range of the general public by the ability and enterprise of Mr. James How, of Foster Lane, London, were arranged in the bird-room, and attracted a large number of discerning visitors till half-past seven, when the current of interest and curiosity set in towards Dr. J. B. Edwards, who was wedding fun to philosophy in another large room, by blowing soap bubbles of varied design with Plateau's glycerine solution. This exhibition was suggestive of youthful reminiscences; and, although the objects were transparently unsubstantial, yet they proved as lasting as some of the "bubbles" which modern enterprise sets afloat. One virtue attached to the Doctor's bubbles, for when they they did burst they produced none of the heart-scalds, undermined no cherished hopes, blighted no useful prospects, nor ruined the industrious, economical, and striving, as those often do.

At seven o'clock the gong summoned all to the theatre, or large hall, where the President, ALFRED REDFORD, Esq., took the chair, and prefaced the programme for the evening with a few introductory remarks. He said it had always been the study of the Association, in providing an evening's entertainment like the present, to blend pleasure with instruction. The Association invited its members to intellectual enjoyments, which it believed elevated and informed the mind as well as cultivated the taste, and afforded them an opportunity of becoming acquainted with the most recent discoveries of science and the ever-advancing appliances of human ingenuity and skill, by which the wonders and mysteries of nature were, from time to time, unlocked, and the grand total of human knowledge augmented. Referring to the programme, he said that local celebrities stood honourably prominent in their readiness to lead into the pleasant fields of intellectual enjoyment. Both members and non-members of the Society had most kindly placed their valuable microscopes and other apparatus and objects of interest for the inspection of the visitors. Besides these, they had among them, in Professor Hunt, a gentleman who had long held a prominent place in the scientific world, and had thrown the lustre of his genius around the interesting subjects of photography and the chemistry of light.

Mr. H. Sugden Evans, F.C.S. then exhibited on the screen with the lime light a beautiful series of micro-photographs of microscopic objects, by Dr. Maddox. These were very much admired. Dr. Edwards succeeded, and likewise projected on the screen images of whole insects by means of Ladd's solar microscope, and Mr. Evans the corresponding photographs by the lime light. After these exhibitions the company adjourned for refreshments and promenade. Photography, in another form, had its votaries in this interval; and the very fine stereoscopes, lent by Messrs. Wood and Chadburn and Son, of Lord Street, were besieged. Chadburn's patent graphite telegraphic instrument was a suggestive as well as an interesting object to others, and its merits seemed to be much appreciated by those interested in telegraphy. There were various other novelties that drew parties to them. Among these were the Mortimer ship-aquarium, invented by Captain Mortimer, of the ship 'America,' for the conveyance of fish, etc. beyond the seas, for the examination and study of living marine and fresh-water specimens on board ship. The various living American fish exhibited in the Aquarium-room, Derby Museum, have been thus imported by Captain Mortimer, and many British fish, etc. successfully conveyed by him to America. The specimens exhibited on this occasion were a sun-fish, *Pomotis vulgaris*, and some small fish of the carp tribe imported by Captain Mortimer. These, together with a collection of dodo bones from Mauritius, collected and presented by Harry P. Higginson, Esq.; a specimen of *Eozoon Canadensis*, from the Laurentian limestone of Canada (the earliest known fossil); the head of an *Ichthyosaurus*, and other fossils, were kindly lent by Thomas J. Moore, Esq., of the Derby Museum.

Models of ships on a new principle, patent anchors, patent logs, and a machine illustrating centrifugal action, were kindly lent by Captain Walker, C.E. Mr. Alfred Higginson exhibited a gyroscope, and Mr. Marples examples of Chinese miniature painting on rice-paper, wood and ivory carving, etc. etc.

At half-past eight the President resumed the chair in the theatre, when Dr. Edwards gave illustrations of the effect of vibratory motion in producing figures and musical notes. The figures were successfully represented on the screen by the aid of the electric lamp, and on a fixed plate in sand, and the notes were musically intoned by the singing flame, harmonic tuning-forks, and the siren, on which instrument the Doctor operated with such bewitching power, that many, especially of the tender sex, were led to think that *he* was the *siren*, and the instrument but a blind introduced to betray the judgment.

At nine o'clock, the President introduced Professor Hunt, F.R.S., the Keeper of the Mining Records. The Professor, who was well received, proceeded to deliver his lecture "On the Sun and the Earth," and which constituted the main attraction of the evening. The lecturer acquitted himself of his task most successfully and eloquently. It would be difficult to give even an abstract of the discourse without detracting from its merit, for the lecturer's clearness of definition and descriptive painting is peculiar to himself. The appreciation of these qualities was frequently manifested by the loud and hearty applause of the audience.

After the the lecture concluded, the President offered a few remarks, reviewing the evening's entertainments and their respective merits, expressing his obligations, as well as those of the Council, to the gentlemen who so kindly contributed to the success of the conversazione, and to the company for the patience and good feeling they manifested. He concluded by proposing a vote of thanks, to be carried by cordial acclamation, to those gentlemen, and especially so to Mr. H. Sugden Evans, Dr. Edwards, and Professor Hunt. The proposal was warmly responded to, after which the proceedings terminated at half-past ten o'clock.

LEEDS CHEMISTS' ASSOCIATION.

The Sixth Meeting of the Session was held in the Library of the Philosophical Society, on the evening of March 14, 1866; the President, Mr. Haigh, in the chair.

Mr. Samuel Taylor read a paper, entitled "Hints to Dispensers," of which the following is an abstract:—

The subject naturally divides itself into two parts, viz. Hints to the Head, including all those qualifications of *mind* and *temperament* which fit a man for becoming a good dispenser; and Hints to the Hands, under which head a few suggestions may be offered touching the general manipulation of a prescription.

Under the first of these divisions, it will be well to observe that a good general education is perhaps the most essential qualification. A dispenser's writing should be clear, distinct, and neat, at least; so that no blame may attach to him, for mistakes in reading his directions. His orthography and acquaintance with "Murray" should be unimpeachable, so that patients may not have their faith in his medicines rudely shaken by any fault of his on this score. A good practical knowledge of figures, especially the multiplying and dividing of fractions, will be of great service to himself, and is necessary to the safety of those who have to take strong preparations coming from his hands. Under existing circumstances, *i. e.* whilst the Pharmacopœias are wholly or partially, and physicians' prescriptions almost entirely written in *Latin*, it is important that the dispenser be at least well grounded in that language. The stigma so often laid upon us as a class, that ours is a system of "Dog Latin," is owing to a deficiency in this branch of education amongst us, and is one that comes within the province of associations like this to remove, by establishing classes for the better instruction of the younger portion of the profession in the Latin language.

The next qualification, under this division, necessary to a dispenser, is a good knowledge of chemistry and materia medica; of which two subjects, the more he knows, the pleasanter will be his duties, and the higher the position he is likely to attain amongst his professional brethren and in the world.

Posology is another branch of information in which the dispenser should be well up, as medical men are not infallible, but, like the rest of humanity, sometimes liable to err. He should therefore be able at a glance to detect an overdose, and thus act as a check betwixt the doctor and the patient. These are qualifications of mind which can only be acquired by assiduous attention, but which must nevertheless be attained ere the dispenser can practise his calling either with comfort to himself or safety to his clients. There are, however, certain other mental qualifications, which, though not absolutely essential to the compounding a prescription, are yet highly important, and deserving attention. The most important of these perhaps is caution, from the want of which so many sad accidents have occurred, spreading dismay throughout the profession and the country. This caution or care need not interfere with dispatch in dispensing; for many dispensers, by the power of concentrating their thoughts upon the one object then in hand, have been remarkable for their quickness as well as correctness in dispensing. A few aids to correctness may here be mentioned:—that of copying prescriptions prior to making up the medicines or writing the labels, whereby the general meaning and composition of the prescription is impressed on the mind; that (where practicable) of having all medicines prepared by the dispenser, checked and sent out by either the master or another assistant; that of having the measuring of all powerful remedies, as tr. aconiti, tr. nucis vomic., preparations of hydrarg. oxymur., etc., when ordered for internal administration, witnessed. There is further, the now generally adopted arrangement of a chemist's shop, so that the dispensing of medicines is kept quite apart from the retail counter. In shops where the stock-bottles are exclusively stoppered, a tin cap fitting loosely over the stopper would probably form a sufficiently distinctive feature to distinguish poison-bottles from ordinary ones; or if caps be the covers for many of the ordinary bottles, then a different-shaped one might be used for the poisons. Still these are but aids, and the great security against accident lies in the concentrated attention of the dispenser. Quickness of perception, or a readiness to understand the general interpretation of a prescription; coolness, or a collectedness of mind under a heavy pressure of work, are also qualifications worth the cultivating.

Under the second head it may be just remarked at the outset, that a quick eye and delicate nose are both useful as checks and tests. Medicines, as generally prescribed in this country, may be classed under one of the following divisions:—liquids, comprising mixtures, lotions, liniments, gargles, etc.; pills and powders; ointments and plasters. The first class will demand the largest share of attention. In compounding medicines, avoid using a mortar as much as possible, thereby preventing unnecessary trouble and straining, as liquids very rarely come out of a mortar in the same condition as they entered it. Many of the soluble salts, such as bicarbonate of potash, bicarbonate of soda, Rochelle salts, etc. (if of the best make) are perfectly and readily soluble in ordinary aqueous vehicles, yet how common the practice of rubbing them down in mortars, thereby running the risk of contaminating them, besides losing time. The heavy carbonate of magnesia and trisnitrate of bismuth may also, as a rule, be slipped into the bottle, without the necessity of dirtying a mortar. All soluble scaly preparations dissolve more readily in the bottle than by rubbing in a mortar. On the other hand, there are many cases in which the use of the mortar is absolutely necessary to the production of an elegant mixture; as when bulky powders are prescribed, which must be gradually rubbed up with the liquid; also when considerable effervescence takes place in mixing; when hot water is required for solution; when crystals are to be broken down and dissolved, or rubbed up when insoluble. When extracts are ordered in mixtures, the readiest means of dissolving them is by working them into a smooth liquid paste on a slab with a palette knife, and then scraping off into a measure containing more of the vehicle, and gently mixing with the knife. Oil of almonds and olive oil, when ordered with liquor potassæ, form a very nice emulsion, by diluting the alkali freely, and shaking the two together. When compounding a mixture containing ingredients which act chemically upon each other, it is advisable to keep them as far apart, and as much diluted, as possible. Chloroform, creasote, and essential oils, should, if any tinctures are present, be dissolved in them prior to being added to the mixture. In rubbing oil of cubebs or other essential oils in large quantities with mucilage, great care is necessary to avoid an insoluble compound forming: this may be prevented by judicious diluting during the process. Gallic acid should be dissolved in hot water, as also should quinine, if there be no other solvent present; but care must be taken to ascertain that there is not more of either than the mixture will afterwards retain when cold. Tincture of benzoin, tolu, and other gum-resin tinctures, should be added to mixtures nearly at the last, and immediately shaken gently. Hydrocyanic acid should be added last of all. Nitrate of silver, diacetate of lead, and other salts decomposed by ordinary water, should be dissolved in distilled water.

The following queries may here be put:—What does a medical man intend when he expresses the quantity of any powerful medicine in a mixture by the term *guttas*? Does he really mean drops, or is he under the impression that the difference between drops and minims is so trivial as not to necessitate his particularizing? When the term "ad Octarius" occurs, which is intended, a sixteen or twenty ounce mixture? Is it generally understood that unless the prescriber specifies P.B. he means P. L.?

The next class to be noticed, are pills and powders. With respect to the latter, the best mode of obtaining a uniform admixture, perhaps, is, by weighing and rubbing well together the smaller quantities first, and then adding the larger ones gradually; and in cases where large quantities of bulky powders are ordered, by sifting. As to their division into separate doses, probably a practised eye may be more safely trusted than many a pair of dispenser's scales.

Pills should be kept as small in size as practicable. In order to this, some of the soft extracts in general use might be kept dried down ready for making up, or in the case of those seldom required, by evaporating them on a small pill tile in front of an ordinary fire. Rhubarb should be made up with some thin liquid, and as much added at once as will be sufficient to make up the mass. Quinine pills may be kept down in size by reducing the quinine to a fine powder before attempting to make up.

Some substances are very difficult to incorporate. The sulphates of zinc and iron should first be reduced to fine powder, and confection of hips (that sheet-anchor of the pill-maker) be used to bind them into a mass. Creasote and essential oils are rather troublesome things to get into pill-masses when ordered in large quantities; some recommend their being absorbed by any powder ordered along with them, or added expressly for the purpose; others, that they should be added last; and others, that they should be made into a mucilage with a few drops of strong solution of gum, prior to being absorbed by the powders. Oxide of silver should be compounded with non-saccharine substances, to prevent deoxidation. Many pill-masses, as the compound galbanum, yield readily to a warm pestle and mortar, when all other treatment fails. The objectionable smell and flavour of valerianate of zinc and other offensive medicines, may be almost entirely covered by a skilful coating of silver leaf or of balsam-tolu.

The next class of preparations—ointments—will not require many comments. They should be made uniform, both in consistency and colour, and every trace of grittiness avoided by rubbing down insoluble substances with oil, or dissolving in hot water such as are soluble, as in the case of iodide of potassium and tartar emetic. A metal knife should not be used for ointments containing nitrate of mercury, corrosive sublimate, iodine, or even red precipitate, if the ointment be melted or the knife have to come in contact with the precipitate prior to its being thoroughly mixed in the ointment.

The last preparations to be touched upon are plasters, as regards the manipulation of which more may be learned by one month's practice than by twelve months' lecturing. Perhaps the stiff "paper form" may be suggested, as affording a great improvement upon the old system of spreading plasters without one. Also that opium, belladonna, and ammoniacum plasters should have an adhesive margin.

A discussion followed the reading of the paper, and the meeting offered its best thanks to the author.

This being the concluding meeting of the session, the Association adjourned until October.

BATH CHEMISTS' ASSOCIATION.

At the April meeting of the Society, held at the Commercial Rooms on Friday the 7th, the President in the chair, Mr. W. W. Stoddart, of Bristol, read a paper on "The Nature and Properties of Heat practically applied." In introducing his subject, the author remarked the great changes that had taken place during the last few years in the study of thermotics, and showed that the phenomena of heat were only those arising from the same force that, under other circumstances, gave rise to electricity, magnetism, and light. The author then briefly sketched the history relative to the atomic doctrine and the dynamical theory of heat, as propounded by Messrs. Joule and Grove, Professors Tyndall, Clausius, Helmholtz, and many others. After giving the characters of atoms, as at present received, and their laws of combination, which were illustrated by examples, the interstitial ether was then described, and the analogies that exist between heat and sound pointed out.

The experiments illustrating the paper were made by using the thermopile and galvanometer instead of thermometers. It was shown that whenever a metallic body was unequally heated, an electric current was induced, the heated end being positive while the cooler one was negative. The author then proceeded to show that when two bodies, heterogeneous in their nature, as flannel and glass, were rubbed or struck together, electricity was developed; but when their natures were homogeneous, then heat was developed. Another difference between the effects of heat and electricity is, that while the former usually lessen atomic affinity, causing bodies to expand, the latter increases it, causing contraction.

A very beautiful instrument was exhibited, which, by means of a combination of levers, would measure accurately a space less than the $\frac{1}{50}$th part of a millimetre; by this means the gradual expansion of zinc and copper wires was observed with the greatest facility. The vibration of atoms was proved by a very pretty experiment, in which some tubes, containing a few of the earthy sulphides, were subjected to actinic rays. Each immediately gave its characteristic colour. The production of heat and cold were shown by solution, crystallization, evaporation, expansion, and contraction of different substances. Specific heat was then explained and illustrated by examples, as was also the well-known law of Dulong and Petit, and its use to the analytical chemist.

The author then proceeded to review the properties of heat, and pointed out their great resemblance to those of light, as polarization, reflection, radiation, and absorption. By means of a bright reflector, the rays of heat, and *apparently* those of cold, were shown to be reflected at the angle of incidence. An application of this property occurs to the pharmaceutist, for should he want his boiling-pans to make a decoction quickly, he would do very wrong in keeping the exterior of his pans bright and shining. So much heat would be lost by reflection, that his gas would be wasted; whereas by allowing the vessel to become coated with smoke or roughened, his decoction would arrive at the boiling-point in the least possible time, and with the least quantity of gas or fire. The radiation of heat most frequently concerns our every-day business. The author explained radiation in the words of Professor Tyndall,—that it is the communication from the particles of a heated body to the ether, in which these bodies are immersed, all atoms being capable of being put into an intense state of vibration, which (vibration) is communicated like sound by means of undulations. It was then stated, that when the interstitial ether was at rest it was quiet and neutral, but that when excited, undulating waves are formed which do not proceed longitudinally as sound in air, but transversely, and whereas only sixteen vibrations of air per second are required to produce a sound, it takes many millions of millions of vibrations of the ether per second to produce a single ray of heat. When the number per second of these vibrations reach 458 millions of millions, we see red light, such as would be seen in a glowing fire; when they exceed 727 millions of millions per second, they become too numerous for the eye to see without special arrangements, but we then have all the actinic properties of the Herschelian spectrum. This was shown by the fluorescent effects of a quinine solution, which, when poured into water and viewed by the magnesium light, appeared as a thick dense fluid falling through a light one. Many experiments fully explaining the phenomena of radiation were shown, by means of two large hollow cubes filled with hot water, the side being covered by different colours; the coloured sides (red and black) radiated freely, while the naked metallic side hardly radiated at all. One of the naked sides, covered with a thin coat of varnish, also gave off copious rays. The pharmaceutist at once will understand the necessity, therefore, of keeping his crystallizing-pans, steam-pipes, infusion-jugs, etc., perfectly bright, or any vessel containing a liquid that he wishes to cool very gradually. A bright pewter infusion-jug will take a very much longer time to cool than a dirty one. The engineer knows full well that if he does not keep his steam-pipes perfectly bright, a great percentage of his steam will be condensed, and he will not get the full power out of his locomotive. Glass and pewter radiate much more than the metals, therefore the chemist knows that the latter are the best material for an infusion-jug. A very familiar instance of the difference in radiating powers is known to most housekeepers, by the custom of covering up the teapot with a woollen covering to prevent its cooling. The benefit is often imaginary, for if the covering be not very loose, indeed, the tea would be cooled very rapidly, because the woollen material is a better radiator than the bare metal. The author proved this, by loosely covering a bare metal cube, when the rays impinging upon the reflector of the thermopile were increased slightly, but when the cover was drawn tightly round the cube, the rays were evolved in the most copious manner. This explains our packing ice in a flannel during the summer, and our pumps in straw in the winter. Gas stoves are another illustration: if made of bright metal, the room would take a long time to get warm; they are therefore always blackened. Heat, like light, passes easily through some solids, but not through others. Those substances transmitting heat are termed "diathermanous," and those stopping the passage of the heat-rays "athermanous." It is very remarkable that transparent bodies are not always diathermanous. Pieces of alum and glass were tried and proved to be nearly athermanous, although perfectly clear and transparent, while a piece of rock salt, when blackened, allowed most of the heat-rays to pass. The best conductors of light and heat are the worst of electricity. For example, a diamond so beautifully transparent absolutely stops an electric current, while a piece of black charcoal, an equally pure carbon, but opaque to every ray of light, is an excellent conductor of electricity. Metals, however, behave differently, and differ among themselves, for a good metallic conductor of electricity is an equally good one of heat. Silver conducts heat sixteen times better than German silver, and fifty times better than bismuth.

A curious, and apparently paradoxical experiment was shown: on one of the metallic cubes, filled with hot water, was placed a small cube of bismuth, and one the same size of iron. On each of these was placed a small piece of wax, when it was found that the wax melted first on the bismuth, although the iron is the better conductor. This apparent contradiction was shown to be owing to the difference in their specific heats, that of iron being 1·138, while bismuth is only ·308,—the iron requiring three times the amount of heat more than the bismuth before it could part with sufficient to melt the wax. It is therefore a matter of some importance in pharmacy as to the materials used for apparatus. A glass or porcelain vessel requires a great deal more heat to boil water than one of copper or iron. Indeed, it is a fact that water is *hotter* in a glass vessel just before ebullition begins than in a metallic one. Boiling goes on far more rapidly and equally in a metallic than in a porcelain vessel. A dry atmosphere is perfectly diathermanous, and permits all the rays of light and heat to pass, while water bars their progress.

The paper was concluded by explaining the beneficial effects of mists and dews in modifying and equally distributing the heat-rays of the sun. The whole was illustrated by a series of illustrative experiments and very delicate instruments.

The President expressed the obligation he felt to Mr. Stoddart for his kindness in coming to Bath. A cordial vote of thanks for the able paper, and the interesting manner in which Mr. Stoddart had treated the subject, was proposed by Mr. Merriken, and carried by acclamation.

ORIGINAL AND EXTRACTED ARTICLES.

INFUSUM GENTIANÆ COMPOSITUM, P.B.

BY A. F. HASELDEN.

Whilst the British Pharmacopœia is still under revision, no apology I trust is necessary for bringing again into notice this much-maligned preparation, probably it would be more proper to say by *some* much-abused infusion; for, after all, it would seem that the objection to it rests mainly upon a difference of opinion, as to whether the flavour of lemon or coriander is to be preferred, as there are to be found staunch admirers of both; but I labour under the impression that none take exception to the process, at least I have not yet met with any who complained upon that score. I have more than once prepared infusions according to the P.B. process, employing the ingredients, in the one case, of the British Pharmacopœia, and, in the other, those of the London; and having kept both for six or seven months under the same conditions, can speak favourably alike of them as to their remaining good and fit for use. When first made, the lemon flavour, or, as I have heard it defined, the punch-like odour of the London infusion, to my taste is decidedly preferable to the coriander of the British; but I am bound to say, that by keeping, some of the freshness of the lemon disappears. Still even then, taking it *per se*, I prefer it; but when mixed with other substances in draughts or mixtures, the difference between the two is in many instances scarcely, if at all, perceptible. Possibly the admirers of coriander would be satisfied with the retention of the process, whilst lemon was substituted for the pet carminative fruit; seeing that it plays a prominent part in several other preparations, it might the more readily be resigned in this.

Having once more opened the question of infusions, I cannot resist the temptation of lengthening this communication, for upon this particular subject, as upon pharmaceutical ones in general, there is an *embarras de richesses*, in consequence of the different views taken of them by different minds. An advocate myself of fresh infusions, and a steady supporter of orthodox institutions, I still cannot help thinking that more might be done towards applying the process instituted for gentian to some of the other infusions; by way of experiment I have tried cascarilla, calumbo, and orange, simple and compound, and the result justifies me in saying that I believe the plan would work well. It may not be amiss to offer some reasons for thus urging the trial of infusions so prepared; in the first place, as a pharmaceutist I do it in the interests of those, and they form a large portion of every class of chemists and druggists, who, not having a great or continuous supply of prescriptions daily, find it alike inconvenient and wasteful to be constantly preparing that for which they have no certain demand, and for the preparation of which the customer does not like to wait one, two, or three hours. I may be told that the daily outlay for half a pint of fresh infusion of every kind in the Pharmacopœia would entail but a very small expenditure; I would say in reply, that small as it might be, it would fall probably upon those who should be the last subjected to such a tax. Another potent reason is this, that a sound infusion prepared as suggested would be decidedly preferable to one that was just upon the turn, though not precisely bad; and I ask all observant and conscientious men, whether such a contingency is or is not possible, even in the best regulated establishments; and the eye which discerns fractures where others see but flaws, cannot be everywhere,—and, after all, the best of men are but mortal. Moreover it is a fact, a well-known fact, that concentrated infusions are made in large quantities, consequently must be used by some one, possibly by the general practitioners, possibly also by others, and though admirable imitations of some of the fresh infusions can be produced in a concentrated form, every one has not the convenience for so doing; hence another reason, and I think a good one, for admitting into the Pharmacopœia more generally the process I am now advocating, because every one can work it, however small his establishment and however few his appliances; and it is not unworthy of remembrance that a Pharmacopœia is for the guidance of the many and not of the few. Again, it must be patent to every discriminating person, that these excellent and valuable vehicles for more potent medicines are not now used by a great deal as much as formerly; one strong reason for this is, that the prescriber fears that his patient will have to wait whilst the infusion is being made; let there be a preparation that can be always in readiness, without the fear of deterioration or waste, and this motive for the non-employment of useful vehicles would be overcome. I would not urge the adoption of this process if I did not feel that neither the reputation of the prescriber nor the health of the patient would suffer thereby; on the contrary, I honestly believe that both would be gainers. To say that prescribers would do well to dilute their remedies more than they are now in the habit of doing with the bitter infusions, or otherwise, may seem presumptuous; nevertheless I cannot let the occasion pass without suggesting it as a subject worthy of their consideration.

16th April, 1866.

PHARMACEUTICAL LEGISLATION AND THE SALE OF POISONS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—A careful examination and comparison of the evidence given before the Select Committee on the Chemists and Druggists Bill, extracts from which have appeared in your columns,* will, I think, suggest the true principles of pharmaceutical legislation, and explain why it has made such slow, or, I may say, no progress hitherto. A Pharmacy Bill adapted to meet the requirements of the trade, and likely to receive the sanction of Parliament, must, I conceive, embody provisions for the uniform registration of all chemists in business at the date of the Act, for the compulsory examination of all chemists before entering business, avoiding all meddling with the question of poisons, or the introduction of restrictive clauses of any kind, together with any complex machinery for carrying the Act into effect, and placing the examinations under an executive appointed, or at any rate controlled, by Government. Both the measures hitherto proposed have, I think, failed in consequence of their not meeting these provisions; but perhaps nothing has tended more to delay legislative action with reference to pharmacy,—by introducing confusion and misapprehension over the whole subject,—than the association of the question of the qualification of chemists and druggists with that of the sale of poisons. These two questions, both highly important, have really nothing in common (except in so far as every social reform is designed to enhance the public good), involving totally distinct principles, and affecting altogether different classes of the community.

A Pharmacy Bill is designed to secure the proper qualification of persons having duties to perform affecting the health and lives of individuals, and is therefore essentially an educational measure. On this point the evidence given before the Committee* was uniformly satisfactory, Drs. Taylor, J. A. Wilson, and Mr. Simon, substantially agreeing with Dr. Quain, "that chemists and druggists who had to deal with matters that may be dangerous to life, either from ignorance or carelessness, should be under some control, and be required to give evidence of their competence to deal with drugs and chemicals." (Pharm. Journ. p. 433.) It is not because the chemist deals simply *in*, but *with*, drugs, etc., capable of acting as poisons, that compulsory examination is here demanded; not merely because he happens to sell poisonous drugs, but in order that he may properly discharge duties which render him liable to a thousand chances of error, involving health or life.

A Poison Bill, on the other hand, must be a measure designed to regulate the sale of poisonous substances, in accordance with certain prescribed conditions, is based on the principle of restriction upon articles sold, and applicable alone to dealers *per se*, mere *retailers*, to whom the principle of examination could not be applied, such as colourmen, oilmen, grocers, confectioners, drysalters, and chandlers. It is plain that these are the traders for whom a Poison Bill is required, as it would be neither desirable nor practicable to confine the dealing in dangerous drugs, etc., to chemists and druggists, although we find so high an authority as that of Dr. Taylor recommending this course. (Pharm. Journ. p. 67.) Such an unwarrantable interference, however, with the requirements of the public and the freedom of trade could never be tolerated, nor would the chemist be benefited by the change; examination is not necessary to secure the safety of the public with regard to the mere *retailing* of articles, whether poisonous or not, for this restriction on sales would be sufficient, and in this way the Legislature can deal with it.

If, then, a simple practical measure, providing for the compulsory registration and prospective examination of all chemists and druggists, could be obtained, the way would be made clear for an enactment requiring certain plain and easily fulfilled conditions to be observed in the sale of poisonous articles by *all other* traders. In such a measure, the exception of *chemists* from its operation would be an essential clause, but without an official register of the trade this is obviously impossible. At present we are an *un*definable, though not an *in*definable,

* Pharm. Journ. Vol. VII. pp. 67, 121, 433, 479.

body, and hence pharmaceutical legislation must precede any satisfactory measure for regulating the sale of poisons. The conditions required by the latter must evidently be of the simplest character, such as clearly that all dangerous articles be labelled "poison," and that both seller and buyer be not less than —— years old.* The chief object in such precautions would be to prevent *accidental* poisoning; suicide by poison or otherwise cannot, I think, be materially affected by legislative interference; the poisons most adapted for this purpose would be generally sought from the chemist, whose superior education alone could guide him in dealing with a would-be suicide; rules, indeed, would help rather than fetter the design of the latter; rules, however, alone can be applied to the general dealer; if, therefore, we look on him as the innocent abettor of suicide, our only course is to endeavour to remove, as Dr. Taylor suggests, the sale of "poisons" entirely out of his hands. Probably, however, the duty of the Legislature does not extend so far as this, and would be practically fulfilled by requiring the general dealer to use such precaution as would ensure against *accidental* poisoning, while the chemist's responsibility can involve no more than that care as to quantities, individuals, purposes, labelling, cautioning, and so forth, to which his education prompts him, but which no Act of Parliament could either prescribe for him or enforce upon him; and having exercised which he is fairly exonerated from reflection. Upon this, as upon some other points, Englishmen may be inclined to think that "they manage these things better in France,"—and it may be true, that there is less suicide *by poison* in that country than in England, but I very much question whether death by suicide is less frequent there than here, or if the difficulty in the way of obtaining poisons materially decreases its frequency.

In addition to the simple provisions above suggested, for regulating the sale of poisons, I would require all dealers in drugs and chemicals—not being chemists and druggists—to take out a drug *licence*, for the sale of those articles which belong exclusively to the drug trade, a schedule of which could be easily prepared, such licence to be of moderate amount, and chargeable on any one of the articles included in the list, and proportioned to the number for which the licence is required. Colourmen, oilmen, and grocers, etc., would be, of course, excepted, as regards those substances,—chemicals, oils, spices, etc.,—which form their proper commodities; those chiefly affected by such a provision would be those grocers and chandlers who deal largely in such articles as carbonate of soda, tartaric acid, milk of sulphur, cream of tartar, etc., to the injury of the chemist, and not unfrequently to the peril of the health and life of the public. It is socially unreasonable and unjust that a licence should be required for the sale of tea, pepper, and spices, while the chemist's opposite neighbour, the grocer, can deal in drugs and chemicals without restriction, from salts to sarsaparilla.† To avoid error in another direction, an exception, in reference to certain articles as strongly poisonous as prussic acid, cyanide of potassium, corrosive sublimate, strychnia, and the vegetable alkaloids, might be added, making

* There is obviously great difficulty in enforcing details of this kind: labelling *alone* is, after all, most feasible, and if actually carried out would probably answer the purposes here contemplated.

† An oilman living a few doors off, and doing a considerable trade, has a part of his shop conveniently fitted with blue stoppered bottles, having such labels as "Acid Nitric," "Acid Hydrochlor.," "Mist. Sennæ Co.," "Inf. Rosæ Co.," "Liq. Vol. C. C.," "Ess. Menth. Pip.," "Ess. Amygd. Amar.," etc. I am not sure that he dispenses prescriptions, but I have no doubt rhubarb and jalap are on his drug list; salt of tartar and Price's glycerine being common counter articles. With such a trader the chemist manifestly stands at a disadvantage, as he could seldom attempt to pirate the legitimate trade of the former without discredit, and he is, therefore, clearly entitled to that legal protection which—without directly forbidding it—will yet operate as a discouragement to the general dealer from pursuing such systematic piracy as is here manifest. But without previous registration this is obviously impossible.

it unlawful for a general dealer to have them on his premises for purposes of sale.

It is easy to see, that the effect of such a measure would be to discourage the sale of drugs by general dealers, except where it was worth while to keep them in such quantities, and to exercise such care in their storing and disposal as would greatly enhance the public safety. Especially would this be the case with small shops in country places, and in obscure parts of large towns and cities, where laudanum has occasionally been sold for tincture of rhubarb, and poisons have been found in the same drawer with some innocuous substance, separated only by a partition. If, moreover, the licence above suggested were higher for *dangerous* than for *innocuous* articles, it would be an additional discouragement to the retailing of the former, or an extra inducement for caution, as, with such an Act in force, it would be easy to trace out the delinquent in any case of poisoning, and if culpable negligence could be satisfactorily proved, it should be made thereby punishable with some proportionate penalty. Those most advantaged by such a measure would be the public, but it would also improve the character of the legitimate drug trade; for even if it created a class of *licensed druggists*, this would not prove any real injury to chemists, who, as a class, would thereby be relieved from their heavy and unprofitable trade, and yet retain the custom of families for drugs, etc. employed for domestic or medicinal purposes; their energies and capital being directed towards the development of the higher branches of the business, which, it may confidently be anticipated, would, with compulsory examinations, be rendered somewhat less keenly competitive.

Undoubtedly, the greatest difficulty in the way of pharmaceutical legislation at the present time is the divided state of the trade with reference to it. So long as we are disagreeing amongst ourselves as to the kind of measure we want, it is not surprising that Parliament refuses to pay much attention to us. It is hardly to be expected that the Government should enter into our trade divisions and prejudices, or attempt to legislate between the accomplished pharmaceutist and his brother traders,—A., chemist and druggist (*i. e.* chemist and *quasi*-oilman and colourman) from Yorkshire or Lincolnshire; and B., chemist and druggist (*i. e.* chemist and *quasi*-apothecary, who doubtless gives "advice gratis") from Whitechapel or Seven Dials. That the admission of all chemists to a uniform status must therefore constitute an essential principle in any Pharmacy Bill receiving the sanction of the Government, is simply a matter of political necessity. If such a measure is worth having at all for the sake of society and our successors in the trade, it is worth the sacrifice of feeling, or even status, on the part of Pharmaceutical Chemists which may be necessary to obtain it, and which would be amply repaid by the consciousness of being instrumental in conferring on posterity the benefits which would accrue from it. The failure of the Pharmacy Bill, prepared under the auspices of the Pharmaceutical Society (in many respects a good measure) to obtain the sanction of the Legislature, was doubtless chiefly due to its non-recognition of this principle of uniform comprehension. Apologizing for the length of this letter,

I am, Sir, yours faithfully,

A MEMBER.

London, S.E., April 16, 1866.

PHARMACEUTICAL LEGISLATION.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In your April number, a "Member by Examination," in his remarks on "Pharmaceutical Legislation," concluded with the hope that every private and class feeling may be suppressed for the common good, in the endeavour to render the examination of chemists compulsory. This, Sir, is liberal! But could not some return be made, by which the present members might receive some acknowledgment of their liberality? Could not some lasting testimony be accorded to those who have laboured for the honour, have borne the burden of the Society, these many years, and raised it to its present high position?

In reading some of the numerous letters on the subject, it occurred to me that such a union of the two bodies was quite possible, without the present members of the Society losing one iota of their enjoyable position. To effect this, let the Pharmaceutical Society obtain a new Act in lieu of their present one, rendering it compulsory for all to pass an examination after a certain date; admit all chemists in business as members, all assistants as Associates; and present apprentices to pass a Minor examination within one year from the passing of the Act. The present members to be made honorary members, or some other distinctive term, to enjoy all the privileges of the Society without paying the annual fee, the same with all who have passed the Major examination, and registered Associates of the Society; those who have passed the Minor only, to have their fees returned, or to stand over for the registration fee,—these to pay the annual subscription.

All, I think, agree in wishing for a compulsory Act; at the same time all, or nearly all, desire the Act to include the whole body of chemists.

These, Sir, are a few rough ideas of an occasional reader, yet you may perhaps think them worthy an insertion in your valuable Journal. I enclose card and address.

Yours very truly,

April 18, 1866. READER.

EARLY CLOSING.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—A letter appears in the 'Chemist and Druggist' of the 15th ult., signed "Anti-Slavery," and the subject he writes upon is the much-vexed one of "hours of business." As an "assistant," he naturally sees but little difficulty in the matter, and proposes a uniform hour at which we shall *in appearance* close our shops. Nothing is more certain than that keeping our shops open will induce custom, and, for myself, I cannot see why the night-bell should not commence its duties a little earlier than it has hitherto done.

The thing is practicable enough if we could only be unanimous; the old adage, "what is sauce for goose is sauce for gander." If a complete non-appearance of business is assumed by us at a particular hour, our customers will not be long in finding it out; and with respect to the remark made by an employer, also in the 'Chemist and Druggist,' that his neighbour broke the contract entered into between them, I am inclined to believe that if the attention of the public is called to the fact that we are the *only* tradesmen who are excluded from the benefits of early closing, it would show a sympathy with our cause, and that none of our *regular* customers would forsake us. The two or three shops open, supposing such to be the case, would obtain but a doubtful fame as to the civility or attention likely to be manifested towards purchasers who came for the simple reason that they could not get *waited on anywhere else*.

Surely a body of well-educated tradesmen, a portion of the community in whom is placed greater confidence than any other, would not ask in vain of their friends and connections that they might be relieved from their daily labour at the same time as those engaged in other lines of business. I cannot but think that the "difficulty" urged by us as employers in the matter is a great deal of it *imaginary*, and within our own power (if we have but the will) to remove.

I wish a few employers would lay the question well to heart, and give you some opinions on the case, so that before the dreary winter nights are here again we may say that at eight o'clock we have "done."

I am yours,
A MASTER.

April 20, 1866.

PORTRAIT OF THE LATE JACOB BELL.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—On the nineteenth anniversary of the Pharmaceutical Society, as reported in your Journal, Vol. I., 2nd series, p. 601, Mr. George Edwards "observed that, in Landseer's sketch at one sitting, taken only a few days before Mr. Bell's death, they had a marvellous creation of the man, which they would all highly prize." Now this is reported just six years ago, and I had hoped to have seen an engraving published as a frontispiece to the Journal long before this time.

When Jacob Bell was editor, he embellished his fifth volume with a portrait of the first President of the Society, William Allen; he placed a portrait of John Bell as frontispiece to his eighth volume, and the twelfth volume is ornamented by an engraving of Jonathan Pereira.

May I not hope that, at the approaching anniversary, the members will require an engraving of the founder of their Society to be published without further delay?

I am, Gentlemen, your obedient servant,
JOSEPH LEAY, M.P.S. 1841.

April 13*th*, 1866.

IS CHLORODYNE SUBJECT TO A MEDICINE STAMP?

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I beg to send for publication the following correspondence in relation to chlorodyne.

When I found the Board of Inland Revenue asserted that all chlorodynes were subject to the Patent Medicine Stamp Duty, I sent two bottles of mine, as sent out by me, to them, asking if mine was liable. Their reply was as follows:—

"*Inland Revenue Office, Somerset House, London,*
"*7th February*, 1866.

"Sir,—In reply to the inquiry contained in your letter of the 22nd ultimo, I am directed to state that the Board are of opinion that the label on the bottles forwarded by you does not render the preparation mentioned liable to Patent Medicine Duty.

"I am, Sir, your obedient servant,
"T. SARGENT."

On receiving this letter, I issued bills, stating that "T. Barling had received an intimation from the Inland Revenue Office, to the effect that Barling's Chlorodyne is not liable to the Patent Medicine Duty." You will please observe I could not say that all chlorodyne was not subject, but my chlorodyne, with my label, clearly is not, according to the opinion of the Inland Revenue Office.

On the 25th March, I received the following communication:—

"*Inland Revenue Office, Somerset House, London, W.C.,*
"*24th March*, 1866.

"Sir,—The Board of Inland Revenue have had forwarded to them a printed bill or notice, issued by you, in which it is stated that you have received an intimation from this office, to the effect that Barling's Chlorodyne is not liable to Patent Medicine Stamp Duty.

"If you will refer to the letter to which you refer, you will find that it merely states that the use of such a label as was affixed to the bottles transmitted by you, would not constitute such a liability.

"The Board apprehend that this label does not describe the preparation as Barling's Chlorodyne, which implies an exclusive right to the making of the preparation, which would render it liable to the Medicine Stamp Duty, as you will perceive on reference to the enclosed printed extract from the Act.

"It will be necessary therefore that the Medicine Stamp be affixed to the bottles containing Barling's Chlorodyne, and that the paragraph referred to in your printed notice be discontinued.

"I am, Sir, your obedient servant,
"T. SARGENT."

I replied to this, that I could not see that my chlorodyne at all came within the Act, as I was careful not to state anything for which it was beneficial; and stating that I thought they had exceeded their powers in attempting to make chlorodyne used for dispensing purposes liable at all.

To which they replied:—

"*Inland Revenue, Somerset House,*
"*4th April*, 1866.

"Sir,—The Board of Inland Revenue have had before them your letter of the 26th ultimo, in reply to their communication to you of the 24th, pointing out the liability to Stamp Duty of the preparation sold by you under the title 'Barling's Chlorodyne.'

"In reply, I am directed to transmit to you an extract from the Act relating to Patent Medicines, and to observe that their reply, dated 7th February, was given on the statement then furnished by you to them; but the Board have since received further particulars in regard to your preparation of chlorodyne, and they are clearly of opinion that that preparation is liable to Stamp Duty. Unless, therefore, the article be issued in future stamped as a Patent Medicine, you will be liable to prosecution for the penalty imposed by law.

"I am, Sir, your obedient servant,
"T. SARGENT."

To which I replied:—

"*April* 6, 1866.

"Gentlemen,—I am in receipt of yours of the 4th inst., and still cannot see that my chlorodyne is liable to the Medicine Stamp Duty. You must be aware that the name 'chlorodyne' has been decided to be one in which no one has a property; and I not only do not identify mine with Brown's, but calling it my own, I distinctly profess that it is not the article advertised under his name. I have then clearly as much right to call a thing 'Chlorodyne' as 'Essence of Peppermint,' and I do not feel at all inclined to debar myself of such right, and so long as I do not identify it or say what it is good for, I do not see that your prosecution will be very hurtful; indeed, a little unjust prosecution would tend to give my article notoriety.

"I am, yours obediently,
"THOMAS BARLING.

"*To the Board of Inland Revenue.*"

To this I have received no reply.

I should like to be informed the grounds of distinction between the following labels:—

Barling's Essence of Peppermint.
Barling's Syrup of Rhubarb.
Barling's Chlorodyne.

I am, yours obediently,
THOMAS BARLING.

[Mr. Barling will perceive that the ground on which the preparation to which this correspondence refers, is held to be liable to the Medicine Stamp Duty is, that it is described as "*Barling's Chlorodyne*," which implies an exclusive right to its preparation; of course the same would apply to the other articles mentioned by Mr. Barling.—ED. PHARM. JOURN.]

THE SINGLE STEEDMAN'S POWDER QUESTION.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The enclosed correspondence on the above subject seems sufficiently important for a place in your pages. The sale of these powders singly has for years been a source of annoyance, and, as you will see, the reply of the Board of Inland Revenue is sufficiently indefinite to leave the matter pretty much as it was before. Who is to decide what the Board would consider the "very poorest class"? How are we to prove that the powder was sold from a packet "duly stamped"? And, more than all, why grant a special advantage to "this medicine"? My own experience goes to show that it is *not* the "very poorest class" who apply for single powders. I have had great numbers of most respectably dressed people apply for them, stating that they obtain them elsewhere without difficulty.

I am, Sir, yours most respectfully,
GEORGE PATTISON.

"*To the Honourable Commissioners of Inland Revenue.*

"Gentlemen,—So far back as December, 1863, I addressed you respecting the sale of Steedman's Powders singly, and without stamps. Having, at that time, had frequent applications for single powders, with the constant assurance that they were readily obtainable, my inference was that the law, as to their sale, was not strictly enforced. Your reply to me did not clear up this point, but simply stated that the penalty for such sales was ten pounds.

"I now find that Mr. Young, of Ball's Pond Road, has applied to you on the same subject, and that he has published your reply, dated March 6, 1866, and in that reply you state 'that in *strictness* a penalty is incurred,' by so selling the powders in question. Now, this wording of your reply leads to my former inference, that although such sales are in 'strictness' illegal, yet they are *permitted*, or *not taken cognizance* of by your Honourable Board. May I ask if this inference is correct, and if so, if the same rule applies to any other medicine besides the one in question?

"The favour of your reply will much oblige.

"I am, Gentlemen, your obedient servant,
"GEORGE PATTISON.

"126, *St. John Street Road, London, E.C.*
"*April* 2, 1866."

"*Inland Revenue, Somerset House, London, W.C.*
16*th April*, 1866.

"Mr. George Pattison,

"Sir,—The Board of Inland Revenue have had before them your letter of the 2nd instant, in further reference to the penalty incurred by the sale in single powders of the medicine known as 'Steedman's Soothing Powders.'

"As before stated, the law clearly renders a person liable to a penalty who vends this or any other patent medicine in any quantity without a stamp.

"A case has been brought under the notice of the Board, in which it was represented that the purchasers of single powders of the medicine above mentioned were for the most part of the very poorest class, who had not the means to purchase a packet at the price of 1*s.* 1½*d.*, and that the privilege of obtaining the powders singly, if prohibited, would be regarded by them as a very great hardship.

"Having fully considered the representation then made, the Board felt disposed not to insist upon a strict compliance with the law, if a single powder of this medicine were sold without a stamp, under circumstances similar to those above stated, provided that the packet from which the powder had been taken was duly stamped.

"I am, Sir, your obedient servant,

"T. SARGENT."

SULPHOCYANIDE OF MERCURY—PHARAOH'S SERPENTS. OLEATE OF SODA AND SOAP BUBBLES.

In the January number of this volume, allusion was made to this salt, and its use as a toy. An esteemed correspondent, whose experience in the manufacture of this salt has rendered him familiar with it, has sent us the following information, which he desires to be anonymous. Take of anhydrous prussiate of potash (ferrocyanide of potassium), in fine powder, 184 parts; salt of tartar (carbonate of potassa), well dried, 69 parts; sublimed sulphur, clean and dry, 128 parts; finely-powdered charcoal, 6 parts; mix them thoroughly, seeing that there are no lumps of aggregated powder, which object is best accomplished by sifting; and a little extra care in getting the materials thoroughly pulverized and mixed will be amply repaid by the purity of the product.

Place the powder, thus prepared, in an iron vessel, and heat gently (not quite to redness); when the edges and bottom of the mass become fused to about the depth of half an inch, stir it thoroughly and rapidly with an iron rod, so as to melt the whole down as soon as possible. When it ceases to flame, and reaches a state of nearly tranquil fusion, which is attained at a heat materially below redness, it is to be cooled; then dissolved in about six or eight times its weight of water, and filtered or strained to separate the insoluble sulphuret of iron. The clear solution may be considered to be a tolerably pure solution of sulphocyanide of potassium ($K, Cy S_2$), though there are always small quantities of secondary products formed.

The rationale of the process is probably as follows:—The reaction being between 1 equivalent of dry ferrocyanide of potassium, 1 equivalent of carbonate of potassa, 8 equivalents of sulphur, and 1 of carbon; the potassium and the cyanogen of the ferrocyanide, the potassium of the carbonate, and 6 equivalents of the sulphur unite to form 3 equivalents of sulphocyanide of potassium, 3 ($K Cy S_2$), the iron of the ferrocyanide and the remaining sulphur form the insoluble sulphuret of iron, whilst the carbon, assuming the oxygen of the liberated potassium, passes off with the carbonic acid as carbonic oxide, and is burnt during the process.

Having now a solution of sulphocyanide of potassium, the next step is the solution of pernitrate of mercury ($Hg O_2, 2 NO_5$), which is obtained by dissolving mercury in hot nitric acid, and heat until a drop of the solution will not form a precipitate with a solution of chloride of sodium. The solution should then be diluted with water, until each ounce of mercury used is represented by a pint and a half of the solution.

The solution of sulphocyanide of potassium is then poured gradually into the mercuric solution as long as a precipitate is formed, *and no longer* (as the mercurial sulphocyanide is soluble in the solution of nitrate of mercury, when in excess). The precipitate is heavy and subsides rapidly; it is washed in several (three or four) waters by subsidence and decantation, then the creamy sediment transferred to a muslin cloth and squeezed, gently at first, and then more forcibly, and the lump of moist sulphocyanide of mercury, when turned out of the cloth, will be found in just the right condition to be moulded into cones with the fingers. Sometimes mucilage of tragacanth is added, but it is not necessary, as the dried salt ($HgCyS_2$) has, like the white precipitate of the shops, considerable firmness in mass. The actual play of affinities, during the combustion of the salt, is, perhaps, not certainly known; but the following rationale, involving 24 equivalents of the salt, may be assumed to approach nearly to the truth:—

Before combustion.	After combustion.
$24\,(HgCyS_2) = \begin{matrix} Hg_{24} \\ N_{24} \\ C_{48} \\ S_{48} \end{matrix}$	Hg_{12}, passing off in vapour. N_4, evolved in a free state. $5\,(N_4C_6)$, mellon, forming the chief bulk of the snake. $18\,(CS_2)$. The elements of 18 equivalents of bisulphuret of carbon, which, by assuming 108 equivalents oxygen from the air, become carbonic and sulphurous acid gases. $12\,(HgS)$, cinnabar, which partially remains in the snake, and is partly consumed and volatilized on the surface.

While on the subject of chemical toys, we may as well to refer to another. Philosophers, as well as children, may be amused and instructed by blowing bubbles. Several years ago, an account was published of the capacity of a solution of oleate of soda to yield bubbles of extraordinary dimensions and of gorgeous colouring. Our correspondent has taken some pains to investigate this property, and finds that the success of the experiment depends largely upon the purity of the oleate used. The commercial oleic acid made by the manufacturers of stearic acid does not afford an oleate of soda that answers the purpose intended, even though it be purified by combination with oxide of lead, and separation by ether, etc.

The best results were obtained as follows:—Dissolve 2 ounces of good white Castile soap in 20 fluid ounces of boiling water, and add about 1 ounce of sulphuric acid, diluted with 2 fluid ounces of water, and stir together; the fatty acids of the soap are separated and rise to the surface, where they collect and float as a clear yellowish oily layer. The vessel is now removed from the fire, and, with a siphon, decant the acid solution of sulphate of soda constituting the inferior layer of liquid, carefully avoiding the loss of the oily part by stopping in time. The oily acids are then well washed three successive times in hot water, separating them as before; after which, by exposure to cold, they solidify. The mass is then weighed, put in a suitable dish, and half its weight of finely-powdered litharge added, and the mixture digested at a heat of 212° to 225°, until complete union is effected. The resulting oleo-margarate of lead, which differs from lead plaster only in containing a smaller proportion of oxide of lead, is to be agitated with at least ten or fifteen times its weight of ether, in a bottle, until it is completely disintegrated. The resulting liquid is transferred to a filter and closely covered; an ethereal solution of acid oleate of lead passes through, and a residue of acid stearate or margarate of lead is left on the filter. To the ethereal solution add aqueous muriatic acid as long as chloride of lead is precipitated; shake thoroughly, and pour off the resulting ethereal solution of oleic acid, recover the ether by distillation, and the residue in the retort will be nearly pure oleic acid.

To make the oleate of soda, add 2 fluid drachms of oleic acid to 1 pint of boiling water, and then solution of pure caustic soda very gradually, until a clear solution is effected, *very carefully avoiding an excess of soda*, and, when cold, add sufficient water to make the solution measure a pint, if necessary. To this standard solution of oleate of soda, add one-half its bulk of glycerine, and the "suds" are ready for use in blowing bubbles. With a funnel about two inches in diameter, our friend has blown bubbles fully sixteen inches in diameter and of remarkable permanency, and so exceedingly beautiful and interesting, that he felt repaid for the time and trouble expended.—*American Journal of Pharmacy.*

ARMITAGE *v.* BORDASS.—DISMISSAL OF ASSISTANT BY A MONTH'S NOTICE.

This case, which may interest some of our readers, was tried at the Driffield County Court, on the 16th of April.

The question at issue was, whether the defendant, having, by letter, engaged the plaintiff to serve him "at a salary of £20 per year for the first half-year, and £25 for the second half-year," could dismiss him by a month's notice; nothing having been said in the letter as to the power of determining the contract. Mr. G. Hodgson appeared for the plaintiff, and Mr. David Hornby for the defendant. Mr. Hodgson contended—1st, that there was no custom in the trade to dismiss by a month's notice; and 2nd, that even if there was such a custom, as the engagement was for a year, and as there was a written agreement, the defendant could not set up the custom. Mr. Hornby called witnesses who clearly proved the custom, and then argued that parol evidence of the custom or usage of particular trades might always be adduced to *annex* incidents to written agreements, provided there was nothing in such customs *repugnant to or inconsistent* with the written agreement; that in the present case the custom set up was perfectly consistent with the agreement, and no intention was apparent on the face of the agreement to exclude the custom, hence it became part of the agreement. He cited the cases of *Parker* v. *Ibbetson*, 27 L. J. C. P. 236, and *Mentzner* v. *Bolton*, 9 Ex. 518, which were almost identical with the present case.

Verdict for the defendant.

Obituary.

DR. THOMAS HODGKIN,

Who died lately, was born on the 17th of August, 1798, at Pentonville. His parents were members of the Society of Friends, of which body he himself remained through life a member, free from all trace of sectarian narrowness. After completing his education, wholly under private tuition, he studied chemistry, both practically and theoretically, under William Allen, F.R.S. He afterwards studied anatomy, surgery, and medicine, firstly at Guy's Hospital, secondly at the University of Edinburgh, and afterwards at the medical schools of Paris, Rome, and Vienna. He graduated at Edinburgh in 1823, and having completed his foreign medical studies, commenced practice in London in or about 1824. Whilst his private practice was forming he was appointed official curator of the Pathological Museum, and demonstrator of morbid anatomy at Guy's, and delivered a course of lectures on "Morbid Anatomy," which he afterwards published. He was the chief assistant of Dr. Bright in those researches which resulted in the discovery of the disease known as *Bright's Kidney*. He took a very active part in the endeavours used to obtain the throwing open of the Faculty of Medicine in London to the graduates of other universities than those of Oxford, Cambridge, and Dublin; making the path to professional eminence in the metropolis as accessible to the Dissenter as to the Churchman. Whilst thus engaged the College of Physicians offered him a fellowship, although he possessed only an Edinburgh degree. He declined this honour, lest its acceptance should be regarded as a betrayal of his coadjutors in the movement, who would still have remained outside.

On the establishment of the University of London in 1836, his was amongst the first names included in the original charter as members of the Senate, a nomination made by the Secretary of State for the Home Department, and he continued in this post till death. He joined with Sir T. F. Buxton in forming the Aborigines Protection Society in 1838. And when in the first instance the Niger expedition withdrew a considerable portion of Sir T. F. Buxton's special attention from the general question of the protection of the aborigines, and when subsequently his declining strength, and eventually his death, deprived them altogether of the benefit of his labours, Dr. Hodgkin became, and continued thenceforward until his death, the chief support of this society.

He took two journeys to the Holy Land with Sir Moses Montefiore, with the view of assisting in various schemes for the benefit of the Jewish people. He also repeatedly accompanied Sir Moses in other journeys, including one to Morocco in 1864, for the purpose of an interview with the Emperor, which procured the rescue of several Jewish prisoners, and established liberty of conscience both for Jews and indirectly for Gentiles also in that Mohammedan Empire. It was on the second of the journeys to the Holy Land that Dr. Hodgkin's death took place.

Dr. Hodgkin married, in 1850, Sarah Frances, widow of John Scaife, Esq., who survives him. He has left no issue.—*Examiner, April* 21*st*.

TESTIMONAL TO MR. CHARLES SHARP.

Mr. Sharp, the late Librarian to the Pharmaceutical Society, was, on April 6th, presented with a gold watch and a purse of twenty guineas, together with an address on vellum, explanatory of the regard and esteem in which he was held by the students and others connected with the Institution. The presentation was made at a supper given at the Crown Hotel, Holborn, Mr. M. Carteighe, a former student, acting as chairman.

BOOKS RECEIVED.

On Disease of the Right Side of the Heart. By Thomas Mee Daldy, M.D., etc. 1866. London: Bell and Daldy, 186, Fleet Street.

Medicine and Psychology; the Annual Address to the Hunterian Society for 1866. By Dennis Deberdt Hovell, F.R.C.S.E. 1866. London: Bell and Daldy, 186, Fleet Street.

The Toxicologists' Guide: a new Manual on Poisons, giving the best methods of Manipulation to be pursued for their detection (post-mortem or otherwise). By John Horsley, F.C.S., etc. Illustrated by Coloured and other Diagrams. 1866. London: Longmans, Green, and Co.

TO CORRESPONDENTS.

Persons having seceded from this Society may be restored to their former status on payment of arrears of subscription and the registration fee of 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.

T. H. (London).—*Pepsine Wine.* Vol. xviii. page 197.

J. S. (Oxford).—We are unable to give the information required.

J. W. L. (Maidstone).—(1) Babington's 'Manual of British Botany,' price 10*s.* 6*d.* (2) We are unable to give an opinion without seeing a specimen of the salt.

A. M. (Stornoway).—The labels in question would render the medicine liable to stamp duty. The fact of the directions not being on the bottle, but on a wrapper, would not alter the case.

Hexham.—Babington's 'Manual of British Botany,' price 10*s.* 6*d.*

E. J. D. (Jersey).—(1) To be eligible for election as member of the Society it is necessary to be on the Register as a "Pharmaceutical Chemist." (2) To be placed on the Register as a "Pharmaceutical Chemist" it is necessary to pass the required Examinations according to the Pharmacy Act. (3) A mistake; you not being on the Register.

Pater Æneas.—(1) The British Pharmacopœia alone is required. (2) Bentley's 'Manual of Botany,' from pp. 1–134 and pp. 214–217. (3) *Vivâ voce.*

Inquirer (Manchester).—(1) Yes. (2) Fownes's 'Manual of Chemistry,' and Pereira's 'Manual of Materia Medica,' by Farre, Bentley, and Warington.

Student (Brighton).—Apply to the Secretary, giving name and address.

T. W.—(1) No. (2) You will require, besides the 'British Pharmacopœia,' Fownes's 'Manual,' and Bentley's 'Manual of Botany.' (3) We are unable to advise in the matter.

Mr. Mowbray's communication is unavoidably postponed.

Wanted, January, February, and June numbers of this Journal, 1865. Full price given. Apply to Elias Bremridge, 17, Bloomsbury Square.

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, Bloomsbury Square.

THE PHARMACEUTICAL JOURNAL.

SECOND SERIES.

VOL. VII.—No. XII.—JUNE, 1866.

MEETING OF THE MEDICAL COUNCIL.

The General Council of Medical Education and Registration for the United Kingdom commenced its sittings for the present year on Thursday, the 17th of May, under the presidency of Dr. Burrows. The President, in his opening address, alluded as follows to the forthcoming edition of the 'British Pharmacopœia.' "In the Session of 1864 the Council appointed a committee to take steps for the preparation of a new edition of the 'British Pharmacopœia,' and during the last Session the Pharmacopœia Committee made a report to the Council, which was adopted. The Council afterwards thought fit to pass a resolution which may have led members of Council to suppose that a proof copy of the new edition would be in the hands of members one month before this meeting of Council, but the Pharmacopœia Committee did not pledge themselves to this effect, and the report from the Pharmacopœia Committee will no doubt give a full account of the present state of that work, and of the causes which may have interfered with the realization of the expectations of members of Council and the profession." It may be inferred from this statement that the Pharmacopœia is not yet ready for distribution, but we believe we are justified in stating that the work is in type, and may be expected to appear very shortly, unless some fresh cause of delay should occur.

The first subject submitted to the Council for its decision was one in which our readers will feel much interested. It appears that at the last meeting of the British Association the sub-section of Physiology determined to memorialize the Medical Council, suggesting to them "by pecuniary grants and the appointment of suitable persons, to undertake investigation into the physiological action of medicines." The memorialists say, "a few agents, when administered in poisonous doses, have alone been made the subjects of such research; and whilst the medical effects of even such well-known agents as quinine have been admitted for ages, their modes of action are still unknown. Even to this moment our knowledge of the action of remedies rests only upon ordinary observations and general inferences.

"The Committee is well aware of the extreme difficulty of prosecuting exact physiological inquiries in states of disease, and above all, of the necessity for devising new modes of investigation; but bearing in mind recent researches of an analogous nature in health, they do not doubt there are physiologists and physicians of proved ability in such researches who would be able to devise the methods and bring the results to a satisfactory conclusion.

"The Committee also venture to suggest that no experiments should be regarded as satisfactory which (in addition to others) are not made in ordinary medicinal doses in the diseases for the relief of which the medicines are administered (as well as in other poisonous doses), and which are not performed with all the care and exactitude known in modern physiological research."

Dr. Acland, by whom this memorial was introduced to the Council, in moving a resolution on the subject, said "the Council was appointed for three distinct purposes—the registration of practitioners, the superintendence of education, and the construction of a great Pharmacopœia." He urged the importance of having a proper selection made of the medicines to be recognized in the Pharmacopœia, which could only be done by submitting them to the investigation suggested in the memorial. He moved "that the memorial of the physiological section of the British Association be received and entered on the minutes, and, in conformity with the suggestion of the memorialists, that the sum of £250 be placed in the hands of a committee to be hereafter named; and that it be the office of the committee to expend the whole or part of that sum in obtaining investigations on the points calculated to promote a knowledge of the efficacy of the remedial agents which are now assumed to be of service, or of such substances as the progress of science may point out as likely to be of avail in the prevention or the treatment of disease." This was seconded by Dr. Stokes, who said he did not see why they should not make it as perfect a Pharmacopœia as the Council could produce, and he thought by adopting the proposal they would disarm the complaints which had been urged against them, and which were to some extent just. The motion was opposed by Drs. Andrew Wood, Sharpey, Apjohn, Aquilla Smith, Quain, and Mr. Cooper, on the ground that the proposed investigation did not form a legitimate function of the Council. An amendment was moved by Sir D. J. Corrigan to the effect that the proposed investigation did not come within the province of the General Medical Council, and that they had not the power to expend the money required. On being put to the vote, the amendment was carried by a majority of 16 against 5.

Notwithstanding this decision, the correctness of which cannot be doubted, it is to be hoped the subject will continue to receive the attention its importance demands, and that means may be devised and adopted for carrying the proposed investigation into effect.

The Council have also been engaged in deciding upon the preliminary education to be required in medical students before they enter upon their professional studies. A minimum standard of qualification has been fixed to be determined by examination in the following subjects:—Compulsory. 1. English language, including grammar and composition; arithmetic, including vulgar and decimal fractions; algebra, including simple equations; geometry, first two books of Euclid; Latin, including translation and grammar; and one of the following optional subjects:—Greek, French, German, Natural Philosophy. After the year 1869, Greek will be transferred to the list of compulsory subjects.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

AT A MEETING OF THE COUNCIL, *2nd May*, 1866,

Present—Messrs. Bird, Bottle, Deane, George Edwards, Evans, Hanbury, Hills, Morson, Randall, Sandford, Savage, and Waugh,

The following were elected

MEMBERS.

Charity, William	London.
Holroyd, William Henry	London.
Jones, Edward	Exeter.
Pasnin, Thomy	Mauritius.

Resolved,—That two annuities on the BENEVOLENT FUND of thirty pounds each be offered for competition in October next.

Resolved,—That free laboratory instruction be given to the Bell Scholars for the session 1866-67.

MEETING OF COUNCIL, *16th May*, 1866.

Present—Messrs. Bird, Bottle, Brady, Deane, George Edwards, Hanbury, Hills, Mackay, Morson, Orridge, Randall, Sandford, Squire, and Waugh,

To arrange the business for the Annual General Meeting.

EXAMINATION, *23rd May*.

MAJOR.

Horner, Thomas Barker	Woolwich.
Thorn, John James	Crediton.

MINOR.

Andrews, George Henly	London.
Davison, William Henry	London.
Edwardson, Joseph	Liverpool.
Gregory, John James	London.
Hay, Thomas Alexander	Ramsay, Isle of Man.
Padwick, John	Christchurch.
Paffard, Walter Haideen	Canada West.
Rowntree, Joseph	Howden.
Smith, John	Maidstone.
Woodstock, Charles Edmund	Southampton.

REGISTERED APPRENTICES AND STUDENTS.

NAME.	RESIDING WITH	ADDRESS.
Baxter, Robert	Mr. Bryant	Huntingdon.
James, John	Mr. Longstaff	Hereford.
Johnson, Samuel E.	Messrs. Tomlinson and Hayward	Lincoln.
Lakeman, Stephen	Mr. Searby	Norwich.
Lane, William	Mr. Long	Bristol.
Lee, Thomas	Mr. Moorhouse	Manchester.
Pickard, William	Mr. Maggs	Yeovil.
Rayson, Henry	Messrs. Battle and Maltby	Lincoln.
Rew, Walter	Mr. Rew	London.
Sinzininex, Arthur	Mr. Walsh	Manchester.
Smith, David	Mr. Scarrow	Sunderland.
Woodman, George	Mr. Judd	Christchurch.

BENEVOLENT FUND.

Subscriptions received during May:—

Country.

	£	s.	d.
Ashton-u.-Lyne, Bostock, W..	0	5	0
Barnstaple, Goss, Samuel......	0	5	0
Bradford, Yks., Harrison and Parkinson	2	2	0
Bridport, Tucker, Charles ...	0	10	6
Brighton, Cornish, William ...	0	5	0
Canterbury, Amos, Daniel ...	0	10	6
„ Hall, John R. ...	0	10	6
„ Harvey, Sidney...	0	10	6
„ Paine, William...	0	10	6
Cardiff, Greaves, E. T..........	0	5	0
„ Haddock, B. P.	0	2	6
„ James and Williams .	0	5	0
„ Joy, Francis W.	0	10	6
„ Treharne, J. T.	0	5	0
Chatham, Crofts, Holmes C...	0	10	6
„ French, Gabriel ...	0	10	6
Cheltenham, Butcher, Thomas	0	10	6
„ Fletcher & Palmer	0	10	6
„ Prockter, R. E...	0	10	6
„ Smith, Nathaniel	0	10	6
Chester, Baxter, George	0	10	6
„ Bowles, Charles A....	0	5	0
„ Grindley and Son ...	1	1	0
„ Mills, John............	0	5	0
Chertsey, Boyce, John Pierce .	0	5	0
Chowbent, Warburton, Thomas	0	5	0
Colchester, Chaplin, J. L.......	0	5	0
„ Manthorp, Samuel	0	5	0
„ Shenstone, J. B....	0	5	0
Crickhowell, Christopher, W..	0	5	0
Diss, Cupiss, Francis	0	10	6
Exeter, Bromfield, Charles ...	0	5	0
„ Cooper, George	0	10	6
„ Husband, Matthew ...	0	10	6
„ Palk, John	0	10	6
„ Stone, John	0	5	0
Exmouth, Thornton, Samuel...	0	5	0
Fordingbridge, Haydon, F. W.	0	5	0
Gt. Malvern, Burrows, Messrs.	1	1	0
Harrogate, Greenwood, John	0	10	0

	£	s.	d.
Hastings, Amoore, Charles ...	0	10	6
Haverfordwest, Saunders, D.P.	0	10	0
Hay, Davies, John L.	0	5	0
Heavitree, Brailey, Charles ...	0	5	0
Jersey, Millais, Thomas	1	1	0
Leatherhead, Hewlins, Edward	0	10	6
Liverpool, Thompson, John ...	0	5	0
Manchester, Halliday, W. Jabez	0	10	6
Market Drayton, King, W. G.	0	10	6
Monmouth, Davie, Sampson ...	0	10	6
Newbury, Hickman and Son ..	1	1	0
Norwich, Caley, Albert J. ...	0	10	6
„ Cooke, William......	0	5	0
„ Sutton, Francis......	0	10	0
Nottingham, Fitzhugh, Richd.	1	1	0
„ Parr and Atherton	1	1	0
Partick, Rait, Robert C.	0	10	0
Plymouth, Essery, William ...	0	5	0
Rochester, King, Thomas S....	0	10	6
St. Day, Corfield, Thos. J. T. .	0	10	6
Sheffield, Botham, William ...	0	10	0
„ Gowland, Messrs. ...	1	1	0
„ Jennings, John E. H.	0	10	0
„ Malcham, Henry ...	0	10	0
„ Radley, Wm. Y. ...	0	10	6
Sittingbourne, Rook, Edward .	0	5	0
Southport, Walker, Wm. Hy. .	0	10	6
South Shields, Mays, R. J. J. .	0	5	0
Taunton, Gregory, George H.	0	5	0
„ Prince, Henry	0	10	6
Thornton in Craven, Wilson, T.	2	2	0
Tenterden, Bolton, Thomas ...	0	5	0
Wath upon Dearne, Hick, Allan	0	5	0
Warrington, Redmayne, Chris.	0	2	6
„ Webster, S. H...	0	5	0
Weaverham, Mainfold, John J.	0	10	6
Windsor, Russell, Chas. J. L.	0	10	6
Worcester, Witherington, T. ..	1	1	0
Yarmouth, Bond, John.........	0	5	0
York, Linsley, Thomas	0	5	0

London.

	£	s.	d.
Best, James, Harrow Road ...	0	10	6
Bishop, A., Mile End, New Town	2	2	0
Charity, William, Swan Lane.	1	1	0
Coles, Ferdinand, Chelsea......	0	10	6
Fenn, J. T., Westminster......	0	5	0
Goodbarne, Thomas, Hoxton .	0	10	6
Long, Henry, Notting Hill ...	1	1	0
Merrell, J., Camden Town ...	0	10	6
Rowntree, Thomas, Islington .	0	10	6
Stathers, John, Notting Hill .	0	10	6
Towerzey, A., Glasshouse St. .	0	10	6

DONATION.

	£	s.	d.
Bailey, Delamore J., 30, Conduit St. (second donation)	5	5	0

CONVERSAZIONE.

On Tuesday evening, the 15th of May, the annual Conversazione was held in the rooms of the Society, which were, as usual, filled with visitors who had responded to the invitations issued by the President, Vice-President, and Council. A large number of valuable and interesting objects were provided by the kind assistance of friends, many of whom have on former occasions contributed in a similar manner.

The walls of many of the rooms were decorated with a large collection of most beautiful specimens of dried ferns and seaweeds, arranged and contributed by Mr. Jardine. Mr. T. Morson, jun., sent some fine pictures, including a sketch by George Cruikshank, entitled 'Shakspeare's first Appearance on the Stage of the Globe in 1564, with some of the Members of his Company.' Messrs. Vokins also contributed some valuable paintings, including 'Salvator Rosa in the Bandit's Castle,' by Cattermole, and W. J. Grant's 'Last Appeal to Loyalty.' There were some handsome busts, from Mr. Butler; specimens of ceramic ware, from Messrs. Copeland; Majolica ware, from Messrs. Phillips; a very elegant group in oxidized silver, from Messrs. Mappin Brothers; several ancient Spanish and other swords, etc., from Mr. Campkin; some Hindu idols, from the Royal Asiatic Society; some bronzes, from Messrs. Jackson and Graham; a remarkable effigy of Dante, from a cast taken after death, from Messrs. Phillips Brothers, of Cockspur Street; specimens of various woods, hippopotamus teeth, etc., from Mr. Saunders, of Potter's Fields; specimens of Myall wood and a perfume fountain, from Messrs. Piesse and Lubin; a perfume vaporizer, from Mr. Rimmel; a curious painting on stone, from Mr. Goosy; an old stone chemist's sign, injured in the great fire of London, from Messrs. Corbyn and Co.; a Chinese incense-burner, taken from one of the Chinese temples in the last war, from Mr. D. Watson; and a life-size photograph (the largest ever taken) of 'Chang,' the Chinese giant, from the London Stereoscopic Company. Mr. Tennant contributed a collection of gems, etc., including specimens of the diamond, corundum, spinel, ruby, garnet, topaz, tourmaline, rock crystal, beryl, etc.; and Mr. B. M. Wright, of Great Russell Street, sent another very interesting collection of minerals. A large and valuable platinum boiler was sent by Messrs. Johnson and Matthey; specimens of the scaling salts of iron and of lactates, by Messrs. T. Morson and Son; a bar of thallium and specimens of thallium salts, by Messrs. Hopkin and Williams; chemical apparatus, by Mr. How; atomized ether spray producer, inhalers, etc., by Mr. Robbins; specimens of nitrate of silver, etc., by Messrs. Johnson and Sons; and an ice machine, by Mr. Keith. There were also microscopes, from Mr. Ross; a well-finished dividing engine and some microscopes, from Messrs. Horne and Thornthwaite; microscopes, under which was exhibited the play of colours on the surface of a soap bubble; Dr. Bence Jones's new fluorescent substance obtained from the human body; and Holtz's electrical machine (by permission of Dr. Bence Jones), from Mr. Ladd, who also showed the electric discharge in the vapour of phosphorus; spectroscopes, micro-spectroscopes, and microscopes, from Messrs. Spencer, Browning, and Co.; a new registering anemometer, termed an "anemograph," aneroid barometers, etc., from Messrs. Elliott Brothers; microscopes, from Messrs. Murray and Heath; a cruciform sundial, from Mr. Casella; microscopes and surgical instruments, from Mr. Baker, of Holborn, who also exhibited Dr. Richardson's new apparatus for producing local anæsthesia; a number of microscopes, under some of which specimens of the *Trichina spiralis* were exhibited, from Mr. Collins; a large binocular microscope, mounted objects in portfolios, etc., from Mr. Wheeler, of Holloway; apparatus for the measurement and carburation of coal-gas, from Mr. G. Glover;

Carré and Co.'s ice machine, in operation, from Mr. Sheppard; and a pneumatic signal apparatus for domestic purposes; specimens of white marble, from Norway, and silver ore, from Mr. Gisborne. Messrs. George Treble and Son, of Hoxton, exhibited a working model of a chemist's shop window, showing the arrangement of carboys, gas, etc., and the general planning of the window enclosure, two pedestals, with sink and drainer for dispensing counters; a nest of counter drawers, with pill-machine, cork-squeezer, etc., combined; and a nest of shelves, with clips for any size poison bottles. There was also a leech-vase, from Mr. Shillcock, and an improved dental chair, with footstool and pedestal, contributed by Mr. Ashenhurst.

During the evening, Mr. Highley exhibited a number of photographs upon the screen, by means of the oxyhydrogen light in one of the rooms, while in another, Mr. Ansell, of the Royal Mint, showed and explained the numerous forms of his ingenious apparatus for detection and giving warning of the presence of fire-damp in mines. Mr. Fitz-Cook excited considerable attention by the exhibition of results obtained by the Graphotype process, a new system of engraving, which is conducted as follows:—The artist makes his sketch upon the surface of a block of prepared chalk, using for the purpose a quick drying ink composed of a mixture of glue and lampblack. The drawing being completed, the portions of the chalk surface intervening between the lines of the drawing are disintegrated and removed, to the depth of an eighth of an inch or so, by means of brushes of various degrees of hardness, and the chalk block is then hardened by being soaked in a solution of an alkaline silicate. A mould is then taken from the chalk block, and a type-metal cast produced from this mould by the ordinary processes of stereotyping, and it is this type-metal cast that is used to print from. In the course of the evening, Dr. Thudichum delivered a lecture to a crowded audience, in the Lecture Theatre, and exhibited upon the screen specimens of the *Trichina spiralis* and other entozoa, both as mounted objects and also in the living state, the latter being taken, in the presence of the audience, from the back of a live rabbit previously inoculated. At the conclusion of the lecture, Mr. Larkin temporarily blinded every one by a most vivid flash of light produced by the combustion of an ounce of metallic magnesium in powder mixed with chlorate of potash; a flash of light which Mr. Debenham took advantage of to procure an instantaneous photograph of the audience.

In one of the principal rooms was a large collection of medical and economic plants, exhibited by Professor Bentley, from the Royal Botanic Society's Gardens, Regent's Park; some illustrations of leaf geometry from Mr. Coultas, and an extensive and beautiful series of models of Fungi.

Redwood's Patents Company, Limited, contributed a case of fresh meat preserved in paraffin by Redwood's process.

TWENTY-FIFTH ANNIVERSARY OF THE PHARMACEUTICAL SOCIETY.

The Annual Meeting of the Members of this Society was held on Wednesday, the 16th of May, at the Society's House, Bloomsbury Square. Mr. Sandford, President, in the chair.

The President said:—

Gentlemen,—On the two previous occasions it has been my duty—a very pleasing duty—as President, to welcome you here at the annual meetings of the Pharmaceutical Society; it has been a pleasing duty, not simply because it is always pleasant to meet old friends, but also because we have been able on each occasion to congratulate ourselves on the progress of the Society in which we are so much interested,—a progress repaying us for all the time and labour we give to its interests.

There was a time when that progress seemed doubtful; but warned rather than dismayed by the "slack," we never abated one jot in our efforts. It might be, too, that in losing our great Captain, the man who launched our bark and steered her successfully through early dangers into mid-channel, we all felt the greater necessity for both united and individual exertion, and so were ready at the flood-tide to make such headway as I think would have satisfied even him, whose motto in Pharmaceutical matters was always "onward."

Well, Gentlemen, it may possibly be remembered by some of you, that when we met here last year we were in the midst of our exertions to obtain an extended Act of Parliament which would have gone far towards completing the work on which, for a quarter of a century, we have been engaged. I was very sanguine then, and thought the goal was in sight; it seemed to me that the time had arrived at which the House of Commons would recognize the difference between "free-trade" in matters of ordinary buying and selling, which had done so much to benefit the public, and free-trade in pharmacy, which without any counterbalancing advantage deprived the public of one great element of safety: I mean, the educational qualification of dispensers of medicine. The Medical Council had declared such a qualification necessary, and had proposed to enforce it by an addition to their own Act. The Medical Boards in governmental departments had refused to entrust the dispensing for the army to other than those who could produce certificates of qualification from the Board of Examiners appointed under the Pharmacy Act. The House of Commons had been loud in their recognition of the necessity on the second reading of our Bill. And witnesses of the highest authority had been clear and unanimous on the subject in giving their evidence before the Select Committee appointed by the House of Commons to investigate the matter.

Such was the state of the case when we met here last May. But I had been too sanguine of success. The Committee which had heard the witnesses came to a decision in a great degree opposed to their evidence; affirming only that dealers in poisons should be "examined and registered." I must confess to a feeling of disappointment at this result, but to no disheartenment. I regard my expectation only as deferred. I think it easy to prove that if the man who only *sells* poisons should be educated, a still greater necessity exists for qualification in one who compounds them, and therefore I believe that sooner or later that necessity will be recognized by Government.

For the moment the question of Pharmaceutical legislation is in abeyance; but I would urge you all to keep it in remembrance. Another session of Parliament will probably bring us into action again, and whenever we do find the opportunity to go on, I for one shall go to the work in the spirit, as I believe, of the founders of our Society,—of Jacob Bell, to whom I have already alluded,—with a firm conviction that the Pharmaceutical Society was intended to embrace all worthy members of the Pharmaceutical profession, and that until it does so it will fail fully and perfectly to effect its object, —the advancement of Chemistry and Pharmacy to their proper rank in this country.

Now, Gentlemen, I fear that in the presence only of those who have recognized the necessity for education, and given proof of that recognition in the only two ways open to us,—the elder by subscription, the younger by examination,—becoming members of this which is but a voluntary Society, I may lay myself open to the charge of undervaluing it. Nothing could, I assure you, be more unjust. No man values that membership more highly than I do; it has brought me into communication with men whom I may describe (adopting the language of some who do not belong to us) as "the *élite* of the trade,"—men whose acquaintance, but for this circumstance of fellow-membership, I should probably never have enjoyed. If I might venture to add to this assertion an evidence in proof that I have valued and ever endeavoured to uphold the Society, I should point to the mark of honour and confidence which it has pleased your Council on no less than three occasions to confer on me. But I do feel, however delightful it may be to have a select association, that the Pharmaceutical Society was established only as a means to an end; and the wider the grasp of the Society, the nearer it will be to the attainment of that end. I therefore urge you, Gentlemen, to act liberally towards those who have not thought it necessary as yet to join us, in the event of obtaining such an extension of the Pharmacy Act as we require, under whatever name that extension may be called; always remembering, however, that the title of "Pharmaceutical Chemist" is a vested interest given under the Act of 1852; it is the one title legalized, and the one vested interest to be protected, for the original members of the Society as a foundation, and, beyond them, for those only who pass the Major Examination.

I ask you to give nothing without an equivalent; but a power to enforce the examination of all future chemists would be an equivalent. I have had various occasions to regret that chemists are not all registered, and I particularly remember one which occurred two years ago. Feeling, as every man in our business must, the difficulties which beset us in the matter of spirit of wine, for which all persons seem naturally to resort to their chemists, I made application to the Chancellor of the Exchequer, asking that we might be allowed for a small licence fee to retail it under certain regulations. I had several letters from the right honourable gentleman on the subject; he took the trouble to consult the Board of Inland Revenue, and indeed seemed to incline to the opinion that such an arrangement would in itself be good; but his difficulty lay in the fact that chemists and druggists were an unregistered body, and therefore other men, falsely assuming the name, might make an improper use of the privilege. You too saw the value of registration when by it we were enabled to gain exemption from serving on juries.

In quitting this chair, it may be that I shall feel, as I have already stated, some disappointment at the work not being completed, for which we have striven so hard; but I am cheered by the confident hope that it will be in the time of my successor, and the conviction that the efforts we made to attain our end have been productive of great good to the society, exciting interest for its advancement *within*, and a respect for its achievements *without*.

Other circumstances too have occurred during my period of office to which I shall ever recur with lively satisfaction, and not least among them I think the progress of the Benevolent Fund. It has been my privilege to preside over the first election of annuitants, and to announce *success* to an old member who, by adverse circumstances, had been brought to such strait that but for it he must probably have sought a home in the workhouse for the remainder of his days; and it is a greater satisfaction still to see that fund increasing at such a rate as to justify the announcement, which you will find in the next number of our Journal, that the Council will be ready in October next to grant two further annuities, of similar value to the two granted last year. The annuities, and an outlay sufficient to secure a home and education for the child of a deceased member, beyond the ordinary casual relief afforded to other applicants, must surely be pleasing to all. It was rightly predicted by some members of our Council that disbursements from the Benevolent would tend to increase it. The Secretary's report will give you exact particulars up to the end of 1865; but I may be permitted so far to anticipate our next year's statement as to say that up to the present time the subscriptions of 1866 far exceed those of the same portion of last or any previous year. I would guard you, however, against any abatement in your liberality by an over-confidence in our resources. When annuities were first planned, it was on the understanding that none should be given until the accumulated fund had reached £10,000; including our investments since Christmas it only now reaches £7,000; and I am sure you will agree with me in thinking that the Council would not be justified in granting annuities beyond the amount of the interest on *Capital.* We are your Trustees for the proper distribution of this fund, and by the new system of administering it we become the Trustees also of the annuitants; and in the event of a failure of the income, which by your votes you promise to them, they would justly call Mr. Tidd Pratt to their aid, and convict us at least of miscalculation. Our *Benevolent* fund is in fact an *Insurance* fund; an insurance indeed from which we none of us *hope* to benefit, but which we should all view in a business way as if we did.

Gentlemen, we meet on these occasions to consider and discuss the general affairs of our Society, which the Secretary will bring before you presently in the Annual Report; that is the formal document presented by your Council at the close of its official existence; but it is usual for your President to offer some few remarks, less formal in their character, on passing events, and I would avail myself of the opportunity to say a word or two on an old subject lately revived—*I mean the early-closing movement.* It is a subject on which, as a Society, I think we can do nothing; we have always carefully avoided introducing matters connected with the private arrangements of trade into our corporate proceedings; they would assuredly be sources of discord, therefore I hope we shall continue to exclude them; but as individuals it is quite competent for us to consider this question. It is a question of great interest to many associates of our Society, and, indeed, I may say, to members also; but setting ourselves aside for the moment, I think, in the interests of our assistants, we are bound to weigh the matter fairly, not regarding it as a source of antagonism between us, as some recent writers would, I fear, make it by their imprudent counsel, but with an honest desire to do that which is right between the employer and the employed. We cannot shut our eyes to the fact, that during the last few years a growing desire to curtail the hours of business has been manifest throughout the whole commercial community—bankers, merchants, and traders have met that desire in a liberal spirit, and even in our business many establishments, which, when I was an assistant, kept their doors open until eleven o'clock, now close them two hours earlier, and, as I may say from experience, without detriment to their interests. I have great faith in example,—for the advancement of this question, much greater than I have in combination. We see too often, by reports from provincial towns, that agreements to close are made, and very soon departed from; I believe in many cases the departure from the agreement commences accidentally, or by necessity; a man's particular inability to close on a certain night cannot be understood by his neighbour, and so is taken as a wanton disregard of his promise, and becomes actually a source of ill-feeling. Therefore, I say, let each man make his own arrangements, according to the requirements of his particular locality, and do his best to maintain them. I believe the public will acquiesce as readily in such arrangements by chemists as they will in those of other tradesmen.

The Secretary (Mr. Bremridge) then read the following balance-sheet and report:—

FINANCIAL STATEMENT.—*From January 1st to December 31st*, 1865.

Receipts.				£.	s.	d.
Balance in Treasurer's hands				815	0	10
Life Members' Fund:						
Fees	42	0	0			
Interest	74	0	6			
				116	0	6
Government Securities:						
Interest				62	10	6
Rent				83	10	0
Arrears of Subscription				71	8	0
Donations to the Society				2	2	0
Subscriptions:						
359 London Members	376	19	0			
1420 Country Members	1,491	0	0			
104 Associates	54	12	0			
161 Apprentices	84	10	6			
				2,007	1	6
Fees:						
50 Pharmaceutical Chemists . . .	449	8	0			
67 Assistants	278	5	0			
103 Apprentices	216	6	0			
20 Registration Certificates	1	0	0			
				944	19	0
Fees:						
Lecture				173	15	6
Laboratory				457	18	0
Journals:						
Balance of Account				50	10	8
Sale of Steam Boiler				6	6	0
				£4,791	2	6

Expenditure.				£.	s.	d.
Life Members' Fund:						
Investment				42	0	0
Government Securities' Investment				1,000	0	0
Conversazione	59	10	4½			
Pharmaceutical Meetings .	7	12	9½			
Repayments	6	6	0			
Sundries	6	1	5			
				79	10	7
House Expenses				40	11	3
Rent, Rates, Taxes, and Insurance .				436	7	6
Repairs and Alterations				173	2	6
Fixtures and Fittings				47	16	3
Apparatus				11	19	2
Library				45	17	10
Museum (including two new Cases)				42	11	2
Furniture				5	17	6
Stationery				16	14	6
Postage				75	15	3
Printing and Engraving				80	19	7
Advertisements				9	6	0
Carriage				3	0	5
Collector's Commission				31	3	8
Travelling Expenses				127	16	5
Secretary and Registrar				300	0	0
Wages				177	16	2
Expenses of Society in Scotland . . .				66	18	6
Board of Examiners				152	5	0
Professor of Chemistry and Pharmacy, etc.				300	0	0
Professor of Botany and Materia Medica, etc.				250	0	0
Subscription to Royal Botanic Gardens				21	0	0
Laboratory:						
Director's Salary and Percentage on Fees	300	16	0			
Demonstrator	100	0	0			
Porter's Wages	53	18	0			
Chemicals, Drugs, Gas, Coke, Coals, etc.	128	6	1			
				583	0	1
Parliamentary Expenses, viz. Stationery, Printing, Postage, Petitions, Reporters, Travelling Expenses, etc.				139	8	7
Repayment to Secretary				2	11	6
Balance in Treasurer's hands				527	13	1
				£4,791	2	6

BENEVOLENT FUND ACCOUNT FOR THE YEAR 1865.

	£. s. d.	£. s. d.		£. s. d.
Subscriptions	215 15 0		Member and family, late at Southampton	20 0 0
Donations	135 1 0	350 16 0	An Orphan Daughter at Southampton	10 0 0
Dividends		189 9 11	Widow of a Member at Sunderland £25 0	
			Do. second grant, to assist in getting her child into the British Orphan Asylum 10 10	35 10 0
			Purchase of one of the orphans of the late William Bentley, London, into the British Orphan Asylum...	105 0 0
			Premium of assurance on his life	1 11 2
			Member at Brighton	25 0 0
			Widow of a late Member at Birmingham	5 0 0
			Two London Members £15 each	30 0 0
			First Quarter's Annuities to Mrs. Goldfinch and Mr. David Peart	15 0 0
			Printing and Stationery	19 15 6
			Postage	11 5 6
			Advertisements	1 13 6
			Sundries	0 10 3
			Purchase of £290. 11*s.* 4*d.* Consols	260 0 0
		£540 5 11		£540 5 11

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, 1865:—

On Account of the General Fund, New 3 per Cents	£2702	4	9
Life Members' Fund, 3 per Cent. Consols	2611	11	7
Benevolent Fund, 3 per Cent. Consols	6730	16	8
Bell Memorial Fund, 3 per Cent. Consols	2050	0	0

Frederick Barron,
William Edward Becket,
Robert Westwood,
Benjamin M. Tippett,
} *Auditors.*

March 5*th*, 1866.

Figures speak for themselves, and there is therefore but little occasion for the Council to offer any remarks on the financial statement which has just been read; it has been already published in the 'Pharmaceutical Journal,' and consequently long enough in the hands of all members of the Society to be analysed, and, as the Council hope, found satisfactory. The balance-sheet, perhaps, may be regarded as the pulse of the body corporate, and on this occasion resembles the pulse of a sound hearty man in robust health—the sort of man in whom insurance offices take especial delight. It adds to the evidence which has been growing up during the last two or three years, that notwithstanding the original members are removed—as by the common law of nature they must be in an increasing ratio year by year—others join in more than sufficient numbers to fill their places and carry on the work so well begun by the founders a quarter of a century ago, although the Pharmaceutical Society is still but a voluntary institution, and admission to it must be preceded by examination.

The Council cannot but feel great satisfaction at having been enabled to augment the general fund investment, which at the end of 1863 was reduced to £1000, and at Christmas, 1864, amounted to £1564. 19*s*. 5*d*., to £2702. 4*s*. 9*d*. during 1865; and they trust the improvement may so go on that at no very distant date that fund may be equal to what it was before the expenditure which took place in 1860–61, for the improvement of the laboratories and premises generally.

It will doubtless be observed that the Benevolent Fund account no longer forms part of the general financial statement. Owing to its gradual development the Council have deemed it right to separate it entirely from the ordinary monetary transactions of the Society. The increase of this fund and its extended application must be a subject of congratulation to every Member and Associate. Its institution was one of the first objects contemplated at the formation of the Society. Secondary, of course, to the one great design, of advancing Pharmacy by the better education of those who should practise it in Great Britain, but prominently enough to show the importance attached to it by the founders, a "*Fund for the relief of distressed Members and Associates, their widows and orphans*," stands forth in the Charter of Incorporation granted to the Pharmaceutical Society.

At the last annual meeting certain new regulations were announced; or it might perhaps be more properly said that it had been determined then to commence the system of annual relief in the shape of settled pensions, which was planned some time previously, but had never been carried out. That determination seems to have been productive of much good, for the subscriptions to the Benevolent Fund rose from £153. 2*s*. in 1864 to £215. 15*s*. in 1865; the donations, from £13. 13*s*. to £135. 1*s*., and the small increase in the interest on invested capital made the whole income £540. 5*s*. 11*d*. as compared with £347. 8*s*. 11*d*. in the previous year. On the other side of the account, it will be seen that relief was granted to the amount of £232. 1*s*. 2*d*., besides two annuities of £30 each, of which the first quarters were paid in 1865. This commencement of pensions is a great epoch in the annals of the Benevolent Fund. Every Member and Associate of the Society, and every contributor of half-a-guinea, has a voice in the election of annuitants, and will therefore feel an increased interest in the matter. It will be no small gratification to all to be assured that these pensions have been well bestowed; that by one of them an original member of the Society has been rescued from the lowest depths of poverty, and restored to comparative comfort for the remainder of his days.

In both Lecture and Laboratory pupils the Council had the satisfaction of seeing a small increase in 1865, but in the latter department the students fell short of the number which might be accommodated, and which, it was hoped, would avail themselves of the opportunities the Society has, at so great a cost, placed within reach. That better means exist now than formerly of obtaining the required knowledge of scientific Pharmacy and Chemistry during an apprenticeship, owing to the higher educational status of chemists throughout the country who take apprentices, has been before remarked and cannot be doubted; but it must create surprise that the School of Pharmacy in Bloomsbury Square is not more extensively resorted to. Year by year old simple remedies fall into disuse, giving place in some cases to their active principles isolated in the form of alkaloids; in some to complex chemical preparations; and in others even to the agents elaborated by Nature herself for the purposes of digestion or assimilation in the organs of the lower animals, now to be transferred to the human stomach. With such changes constantly going on, the Pharmaceutist who would keep pace with the times needs a far higher scientific education than formerly sufficed, indeed, more than he can obtain under ordinary circumstances during apprenticeship, and the Council have always endeavoured to make the Lecture and Laboratory arrangements fully adequate to supply this want.

At the commencement of the last Session there was no candidate for the Senior Bell Scholarship, and the Council consequently awarded two Juniors, one to Mr. Hall, the other to Mr. Applegate. Of these two students the former is still pursuing his studies in the Laboratory, the career of the latter was cut short by death a few weeks after he entered; so for half a Session a portion of this valuable fund lies dormant.

In the early part of the year the attention of the Council was specially directed to Pharmaceutical Legislation, but the hope expressed in the last Report, that the Chemists and Druggists' Bill then pending in the House of Commons would take its place in the Statute Book was not fulfilled. All the witnesses examined before the Committee of the House of Commons agreed on the necessity for an educational qualification for Dispensers, and all agreed equally in describing the Examinations instituted by this Society as well adapted for the purpose, and the Examiners appointed under the Pharmacy Act as the right men for the discharge of such duties as might be imposed by any future compulsory measure. But the Session of 1865 was terminated before the usual date of prorogation to give time for the election of a new Parliament, and the Committee, after having resolved, that *there should be no compulsory examination or registration of persons already in business as Chemists and Druggists*, but that, *after a certain date to be fixed, no other person should sell certain dangerous drugs unless he be examined and registered*, concluded their Report to the House with the following resolution:—

"*That, inasmuch as there appears to be little prospect of any satisfactory termination to the labours of the Committee in the present Session, it is desirable that the evidence, so far as it has been already taken, and the proceedings of the Committee be reported to the House, accompanied by a recommendation that the Government should, early in the new Parliament, bring in a Bill on the subjects referred to the Committee.*"

The representatives of the Pharmaceutical Society received assurance that no action would be taken by Government without due reference to, and consideration of the Society, and from all that passed it was abundantly evident that there would be no attempt to supersede the Board of Examiners provided by the Pharmacy Act. It was, however, apparent from the whole tenor of the proceedings, that no measure would have any chance of success unless it dealt fairly and liberally with all vested interests; the interests alike of those who were and those who were not already enrolled in the Pharmaceutical Society. Had the Committee of the House of Commons pursued its investigation a little further, it would have found ample proof that the Society had prepared means for giving all men registered under the proposed Bill the opportunity of exercising what was called "a voice in the governing body."

In taking leave of the Parliamentary proceedings of 1865, the Council cannot refrain from recording their high appreciation of the labours of Sir Fitzroy Kelly, who undertook the charge of the Chemists and Druggists Bill No. 1. Always at his post in the House, always accessible to members of the Council, Sir Fitzroy did infinite service to the cause of Pharmacy, and although immediate success did not attend his exertions it may safely be predicted that success will not long be delayed.

The thanks of the Society are also due to the Local Secretaries, who with energy and goodwill ably seconded the efforts of the Council. Such co-operation in the affairs of the Society is of the utmost importance.

Having brought the Parliamentary proceedings to the end of the session of 1865, when they were closed with a recommendation from the Committee that the Government should take up the question "early in the New Parliament," it may naturally be expected that some report should be given of subsequent events; but there is a time to be active and a time to be passive, and circumstances occurred during the recess which gave a different direction to the labours of the House of Commons for its first session.

A Reform Bill had to be introduced, of itself almost sufficient to occupy all the attention of Parliament, and in addition urgent business arose, connected with the cattle plague and other matters, enough to fill up the spare time so completely, that Government could not be fairly expected at once to act on the recommendation of the Committee of the House of Commons as to Pharmaceutical Legislation.

The Council, too, feel to a certain extent bound to await the action of Government, and have the more confidence in doing so from the knowledge that Ministers are in full possession of the history of the Pharmaceutical Society,—its rise, its objects, progress, and present position.

When the time for action arrives, this Society should be ready to submit to Government, or to Parliament, a measure calculated to settle the vexed question of Pharmaceutical legislation in a manner satisfactory to all parties; satisfactory to the public, as giving a greater assurance of safety in a matter which must at all times be one of consequence and anxiety, sometimes even of danger; to the trade, inasmuch as it should give every future dispenser a legal and recognized position, preventing mere hucksters from trenching on his business; to chemists already in business, because, although no compulsory regulations should be allowed to affect them, they would share the benefits arising from a better classification of the trade, and might by voluntary registration obtain means of access to the body corporate, and consequently a voice in its government; and to the Pharmaceutical Society itself, as promoting the one great object for which that Society was established, "*the advancement of chemistry and pharmacy, by the uniform education of those who should practise the same.*"

Mr. Edward Burden then rose to propose the adoption of the Report just read, and in doing so he said it was very refreshing at this time of panic and confusion in money matters to find themselves connected with a Society which was consolidated on a firm basis, with no less a sum than £14,000 invested in the funds (that sum being an increase of £1500 on the amount of last year), without the probability of a run being made upon it, or any other pressing claim by which it might be materially reduced. He hoped it would go on increasing as it had hitherto done. A retrospective view over the period which had elapsed since the formation of the Society would enable them the better to judge of the benefit it had been to chemists and druggists, especially to Pharmaceutical Chemists. At the time when a few energetic men held their first meeting at the Crown and Anchor, in the Strand, in order to repel an agression which, supported in some degree by the medical profession, it then appeared the Government wished to make through Mr. Hawes's Bill on the rights of the chemists; they, as a body, were in a peculiar condition, through want of systematic education, of being scarcely able to lay claim to that consideration which they required at the hands of Parliament. The public then demanded increased security at the hands of dispensers of medicine, and the chemists and druggists were in danger of being legislated for, *contrary to their interests*, and had it not been for the energy of some who have since gone to their rest, together with others who, having been spared to reap the reward of those labours, were present on this occasion, there was no doubt but that, as a body, we should have been found in a more humiliating position than we at present occupy. The progress of Pharmacy and Chemistry would have gone on. Nothing would have impeded that; but it would have found its way into a very different channel, viz. that of the medical profession, and those who had a predilection for those sciences would have had to study them through the means of hospitals and other medical schools; while, as a body, we should have become gradually resolved very much into the humbler position of mere sellers of drugs, such as perhaps existed in Ireland, where the apothecary and druggist are two different persons. Looking at their present position, they were able to judge of the progress they had made through the agency of this Society. Not only had the Pharmaceutical Chemists derived benefit from the past, but those outside the Society had also received much advantage, which they should not forget when hesitating to accede to the reasonable terms offered in Sir F. Kelly's Bill, the one which was promoted by this Society. They were now in the honourable position which might be described as the fourth degree of the medical profession; and instead of being disregarded by that body, and that profession having to look to foreign chemists for new discoveries and improvements in that department of science, they appeared rather to be giving over the cultivation of pharmacy and practical chemistry to the Pharmaceutical Chemists in connection with the Society. He believed he stated the truth when he said that the medical profession now consulted the Pharmaceutical Chemists in reference to new agencies and remedies, and took their opinions on such matters. That was no slight advance over the position they once enjoyed. They were possessed of large premises, an established institution, and, at great cost, they had now laboratories and a museum, which might be classed with any other in Europe. The effect of all this had been to give Pharmaceutical Chemists a higher status in society: already their Board of Examiners were recognized by the Army Medical Board, and he believed Government were prepared to grant them an extension of their powers. Their Journal also found a place on the tables of most of the scientific institutions and medical men in the kingdom, and ranked with any of the medical and scientific journals of the day. It was well conducted, and in addition to its scientific information, it ministered to the business wants of the profession. Their Conversaziones were very entertaining gatherings. Of the few he had attended in his time, he must say he rarely or ever attended any where so many beautiful specimens, of such varied utility, were brought before the visitors, or where there was so much to instruct, and of so unexceptional a character, as were to be found at these friendly meetings of the Society. They had much to cause them to feel great confidence in the course they were pursuing, and he doubted if any other body had so improved themselves during the last twenty-five years, as had the Pharmaceutical Chemists of this country. No doubt there were many who under the greatest difficulties would attain high honour and position, and make themselves conspicuous by their scientific researches even without such a Society; but when they were associated together in one body, they all, as members of one Society, derived some lustre from the fame which surrounded the names of their more talented *confrères*. He must also congratulate them on one advantage they had derived, through their influence as a Society, in their exemption from serving on juries, which, to say the least, had always been a matter of serious inconvenience. In conclusion, he might say that the progress of the Society had given them such a position as a body, that should it be necessary to make further efforts in regard to the Pharmacy Bill, they might present themselves before Parliament, and reasonably anticipate that their demands, if based on moderation and justice, would be granted. The state of the Benevolent Fund was such as deserved their special congratulations, and they ought to feel thankful that the Council had exercised their functions in regard to it with so much judgment and prudence.

In addition to the annuities and donations so well bestowed, he alluded especially to the purchase of an admission of a boy into the British Orphan Asylum, and to the recouping of the expense to the Society by the insurance of the boy's life at a moderate premium. There was, however, in the Report one matter of regret as to the small number of students who attended the lectures and the laboratories; they certainly were not so numerous as could be wished. He did not, however, think this a matter of complaint, but rather an indication that on the part of the Society all had been done that could be done, and that they only now lacked Parliamentary authority to establish them in their position as the examining body of an influential and advancing profession. They wanted this further definition as an encouragement to the rising generation who were inclined to become Pharmaceutical Chemists, to show that after an expensive curriculum they should not be classed with hucksters and other uneducated persons who vended drugs. As soon as they became an authorized body, he believed they would have a larger influx of students. In this and other respects, as regarded earlier closing and business remunerations, he considered they were passing through a crisis ; but until they received the Parliamentary authority they desired, he feared they could take no further steps, or make but little further advance. He therefore called upon the members of the Society to support it as they had done for the last twenty-five years, having no doubt as to the ultimate successful result; and moved that the Report now read be received and adopted, and printed in the Society's Journal.

Mr. Michael Carteighe seconded the motion.

Mr. W. F. Smith (Walworth) said he had, for many years past, felt considerable interest in the Benevolent Fund, and he congratulated the Society on its present satisfactory position. On the last occasion when the lamented Mr. Bell occupied the chair, he (Mr. Smith) drew attention to the Benevolent Fund, and he showed that the average subscription to the Fund, taking all the members, was 6*d.* per head, and now he was happy to say it averaged 1*s.* 4*d.* per head. That was very gratifying, but he should still like to see it something better, because he thought they were in a position to do it. On the former occasion what he said had the effect of inducing his worthy friend and neighbour Mr. Falconer to send him £5 for the Benevolent Fund, with a hope that it might form a nest-egg for future extra exertion. Their excellent Secretary, who had some doubt whether the subject ought to have been stirred up in that way, did however (he was going to say almost condescend to) take it. The present satisfactory state of the Benevolent Fund might therefore, he thought, be ascribed in some degree to what he said on the occasion to which he had alluded. He should very much like to see a *rara avis*, in the shape of a rich Pharmaceutical Chemist, devoting some of his superfluous cash and the remainder of his days in establishing a school where the sons of Pharmaceutical Chemists might get a good education at a less cost than at present in sending them to boarding schools. Unfortunately there were many in the profession who had little money but large families, and it would be of great benefit to them if they could get their sons educated better and at a less cost than what they had now to pay. He hoped his suggestion in this respect might take root in the fruitful brain of some philanthropic Pharmaceutist, there fructify, and prove as satisfactory as had been the state and condition of the Benevolent Fund since he last called attention to it. With regard to the laboratory, he must say that it was a matter of pride and gratification to him to be able to state that his first pupil was now its director. He had been in business about twenty years ; during that time he had had six pupils, and four of them had gone through the laboratory course, with great credit to themselves and he hoped also to the Society. He thought that the small attendance at the laboratory rested very much with the members of the Society, especially those in London, for if they were to make it a necessity that their pupils should attend they would find it would be acceded to, and further that they would get a better class of persons brought up to the profession. He made it a rule never to take a pupil without a good premium, and a condition that he should attend the laboratory course of this institution, and also the lectures. Of course, the master has to exercise some little self-denial by giving out of the exigencies of business five or ten months of his pupil's time to enable the latter to attend to laboratory course and lectures. He thought if such a determination was come to amongst the body generally, that they would very soon have more students in the institution than they would have room for. He hoped that time would come, and come speedily.

Mr. Humpage said he entirely concurred in all that Mr. Smith had said respecting apprentices, and he would add, it gave him more satisfaction to find that 103 apprentices had been united to the Society during the past year than to hear that they were £1100 richer : without such it would be impossible for them to get on. What they wanted was, for an educated body of young men to join them, and he held that the member who took apprentices that had not had a classical education did an injustice to the Society. It was just like asking a sculptor to produce something good without a piece of pure marble ; they must first have the right material if they wished to produce anything satisfactory.

Young men must be instructed with a full knowledge of the benefits of this Society during their apprenticeship, and then they will not be satisfied to enter into business until they have taken advantage of them. The apron must not be cast aside for science, but there must be a happy blending of the two. A taste for the latter must be inculcated by the master, and instruction imparted, so that, either during the term of apprenticeship or afterwards, a young man will feel *he must, at any sacrifice,* enter the lecture-room and laboratory of this Society if he wishes to take a good standing, or even be thought thoroughly to understand his business. The Society was never in a more healthy condition, and as to the position of the Benevolent Fund, it made one's heart beat high to know that this institution had created a fund by which they were enabled to hold out their hand to assist the widow, to wipe away the tears, and relieve the suffering of herself and children. They were doing a great and noble work in that respect, but above all things he begged of them to keep in view the £10,000, which he looked upon as a good foundation, and he had no doubt they would go on and prosper. The Society were much indebted to the Council and their predecessors for what they had done, and if *each member of the Society* would only well follow up the noble work that had been commenced, there would be nothing to fear, but great cause for rejoicing.

Mr. Deane said that as Mr. Smith had mentioned his name he wished to make a few observations upon the education of youth. He concurred in what Mr. Smith had said on that matter. He had always held that one of the greatest misfortunes with which they had to deal was that the greater number of their pupils was drafted from those who were not sufficiently educated: not that they wanted ability, but that their parents and guardians had omitted to give them a sufficient education to prepare them for the responsible position of becoming dispensers of drugs. He would therefore urge on every one to reject apprentices who were not sufficiently well educated, by doing which, they would ensure the ability of the parents or guardians to meet the necessary expenses of the pupils in acquiring a proper knowledge of the profession. He thought the present arrangements gave to the London chemists every facility for the attendance of their pupils; and he was happy to say the Council had adopted what he had for a long time urged, the affording every facility to students so that they might attend even for a few hours as best suited their convenience. There was now no reason why every apprentice or an assistant, if he required it, should not attend the laboratory and the lectures. He would instance the case of his own son. He was able to leave Clapham and attend the laboratory and the lectures; and he was satisfied that so far from being a loser by the apparent loss of the two days a week, he was a gainer, because he had obtained a far greater amount of practical knowledge than he could have obtained behind the counter, even if he had been allowed to make private experiments with his (Mr. Deane's) assistance. His son, from the knowledge he had obtained at the Institution, was enabled to analyse anything according to the process of the Pharmacopœia as correctly as he could. He mentioned it not in praise of himself or his son, but to show what facilities for improvement were offered by the Society.

Mr. Pedler said although every one must feel highly gratified at the position of the Society, both with regard to the educational and benevolent departments, yet there was another side to the picture which was perhaps not quite so pleasant, and that was the abortive character of their late attempts at legislation. It appeared to him that they had taken the wrong course, for, instead of trying to obtain a bill, he thought it would have been better if they had remained on the defensive, and that, by so doing, they would have consulted the real benefits of the members. However undesirable it was to have two bodies, he thought the Society could not congratulate themselves on the summary manner in which the Committee had treated this Society. He mentioned this to caution the Council as to the future, because it was undesirable to do anything which might tend to lower the high position which they at present held in this country. Their great justification to the people and Parliament was the improved position of the body. By continuing to improve it they would become the envy of the trade, and if there were those who would not come in in 1866, they would no doubt in 1876 or 1886, from experiencing the advantage resulting from professional education. He would urge them not to take the initiative with regard to extending their powers or the risking their position with reference to any other body, but, if the Government were prepared to bring in a Bill, let them give them their cordial assistance. He felt more strongly than ever, now that they had lost Jacob Bell, that they had a poor chance of obtaining a Bill that would benefit them. They would not relax in their endeavour to educate young men, and the great thing to bear in mind was to educate, educate, educate; that was the only way to make the Society beneficial to the members and respected by the public.

Mr. Orridge said that the balance sheet presented that day to the meeting was the best justification of the policy that had been pursued by the Council, and also of the course of action taken by the members two years since. Instead of decreasing numbers, they had now the satisfaction of finding themselves numerically stronger, and with greatly improved finances. This was surely a powerful argument in favour of the course that had been pursued.

Mr. Kent said the old members of the Society must be gratified at the great progress that had lately been made. He concurred in a great measure with Mr. Pedler, that it was not desirable to go to Parliament again for a year or two, although he should like to see some legal or Parliamentary power by which future chemists and druggists would first undergo some professional training. He was inclined to believe that the non-attendance at the laboratory course and the lectures arose, in a great measure, with the masters themselves, and he fully concurred in the propriety of their not taking pupils unless they were well educated. It was also necessary that the masters should give their pupils time to study at the institution. The Society had risen to that eminence that he felt certain the masters would feel that they were not doing their duty if they did not give their pupils time to prosecute their studies here. He suggested that as the Society was established for the protection of the trade, it should endeavour to obtain an amendment or alteration in what was popularly known as Lord Campbell's Act, whereby, in case of accident or mistake, the relatives were entitled to compensation; and unless they did so, it appeared to him they would not be doing all they could to protect the members. They ought to be able to do that without the establishment of a legal defence society.

Mr. George Edwards said that there was one thing to congratulate the meeting upon which was not mentioned in the Report. He alluded to the success which had attended the examinations for those who were already in business on their own account. This was a measure for which he had always been an advocate, and he rejoiced that so many had availed themselves of the opportunity of thus joining the Society. Whether they obtained legislative aid or no, their true wisdom was to assist all who were worthy to join their ranks; and, he was happy also to know, that the examination he referred to, had so commended itself to the judgment of those who had passed it, that they had become warm friends to the Society, and had immediately recommended their apprentices to join it. On one occasion, of the apprentices who came to be examined, one-half were from chemists who had just passed the examination themselves. He would urge them to remember what Mr. Deane had said about short periods for study in the laboratory. There had been two courses open to the founders of this Society,—one was to make it a kind of club for a few of the *élite* of the trade, and the other to make it the means of raising and benefiting chemists everywhere. If the first had been chosen, then this great outlay upon laboratory and library and complete establishment was wasteful and foolish, but, if the latter, then it would prove the truest wisdom. He, for one, had rather see the laboratory filled with apprentices and students for short periods. gaining sufficient knowledge to qualify them well and wisely to discharge the duties of their business, than see a few pupils there passing through an elaborate course of chemical study, even if some proved rivals to Liebig. These would probably leave the business after all, while the others would have just that for which many of them had often sighed when apprentices,—opportunity to verify their book-learning, and make themselves really acquainted with the groundwork of that chemistry which would always be useful to them. Reference had been made to Lord Campbell's Act, and he had always considered that it pressed with great cruelty upon a chemist. In the recent case at Liverpool, the shop was chosen because it bore one of the highest names in that part of England for carefulness and attention; this renown was the very thing which brought the prescription there; and yet, whilst the person who really made the mistake went scot-free, those who had devoted untiring attention to do all in the power of men to prevent error and accident, were fined a sum which, to most men in the business, would be ruin. But many legal difficulties were in the way of any change, and he could only say that he was sure that this matter, as well as every other affecting the interests of the trade, would always receive the best attention of the Council.

The resolution was then unanimously agreed to.

Mr. Hills wished to say a few words in reply to Mr. Leay's letter which appeared in the last number of the Journal, respecting an engraving of the portrait of his kind friend, the late Mr. Jacob Bell. The picture, as the meeting was aware, belonged to him, having been given to him by his friend Sir Edwin Landseer, about four years ago. Since Mr. Leay's letter had appeared, Mr. Hills, being desirous of carrying out the wish there expressed, had seen Sir E. Landseer on the subject, who had kindly given his consent to the carrying out of that which he (Mr. H.) now proposed:—That the picture shall be engraved by a first-rate artist, approved by Sir E. Landseer, and that he (Mr. Hills) would pay all expenses, and that the money obtained should go to a fund, the interest of which should be expended in standard pharmaceutical works, which should be given to those who had passed the Minor Examination, to the satisfaction of the Board of Examiners. Mr. Hills had not matured his plan, but he thought that if the proposal were taken up with spirit, a sum of from £500 to £1000 would be secured, realizing £15 to £30 a year; and he suggested that there might be 100 artist's proofs before letters at £3. 3*s.*; 150 artist's proofs after letters at £2. 2*s.*; 300 proofs at £1. 1*s.*; and 500 at 10*s.* 6*d.* each.

Mr. Brady said that their obvious duty at that moment was to thank Mr. Hills very warmly for the generous proposal he had just made. The subject was new to them all, having been broached for the first time that morning. He would ask the meeting to recollect that the copyright of a picture by Sir Edwin Landseer was of great money-value, and the Vice-President was practically making the Society a present of a fund equal to the amount such a copyright would yield. The details of the appropriation of a fund so raised might well be left for future settlement; he would only move that the proposal which had been made to them met with their cordial approval, and that the meeting should express to Mr. Hills their warmest thanks for his offer.

Mr. Orridge reminded the meeting that to make Mr. Hills's scheme a successful one, the members must support him by taking copies. He then seconded the motion, which was carried by acclamation.

The following fourteen Members having been nominated for the Council for the ensuing year in due form, their names were submitted to the meeting, and they were elected:—

Messrs. Bird, Carteighe, Deane, G. Edwards, Hanbury, Hills, Ince, Mackay, Morson, Orridge, Sandford, Savage, Squire, and Waugh.

And, in like manner, Messrs. Barron, Westwood, Mackey, M'Culloch, and Breton were elected Auditors.

The following gentlemen were then declared to be Members of the Council for the ensuing year:—

Bird, William Lionel, 42, Castle Street East, Oxford Street.
Bottle, Alexander, 37, Townwall Street, Dover.
Brady, Henry B., 40, Mosley Street, Newcastle-on-Tyne.
Carteighe, Michael (Dinneford and Co.), 172, New Bond Street.
Deane, Henry, Clapham.
Edwards, George, Dartford.
Edwards, John Baker, Royal Institution, Liverpool.
Evans, Henry Sugden, 56, Hanover Street, Liverpool.
Hanbury, Daniel Bell, Plough Court, Lombard Street.
Haselden, Adolphus F., 18, Conduit Street.
Hills, Thomas Hyde (John Bell and Co.), 338, Oxford Street.
Ince, Joseph (Godfrey and Cooke), 26, St. George's Place, Knightsbridge.
Mackay, John, 121, George Street, Edinburgh.
Morson, Thomas N. R., 38, Queen Square, Bloomsbury.
Orridge, Benjamin B., 30, Bucklersbury.
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.
Waugh, George, 177, Regent Street.

The following gentlemen were declared to be Auditors for the ensuing year:—

BARRON, FREDERICK, 2, Bush Lane.
WESTWOOD, ROBERT, 16, Newgate Street.
MACKEY, JOHN BRUNT, 15, Bouverie Street.
M'CULLOCH, WILLIAM, 5, Coleman Street.
BRETON, WALTER, 66, Cannon Street.

Mr. KENT moved and Mr. WATTS seconded a vote of thanks to the Council, for the valuable services they had given to the Society.

The motion was carried unanimously.

The PRESIDENT, on behalf of himself and the Council generally, returned thanks, and he assured the meeting that so far as the Council were concerned he felt satisfied that they might rely on them to do all they could to promote the objects of the Institution. What they had done they had done with pleasure, and he hoped it had been productive of some success.

Mr. KENT said that as their Secretary (Mr. Bremridge) so efficiently discharged his duty, they ought not to separate without an expression of their opinion, and he accordingly moved the thanks of the meeting to Mr. Bremridge for the highly satisfactory manner in which he discharged his duties.

Mr. WATTS seconded the motion.

The PRESIDENT assured the meeting that Mr. Bremridge deserved all the thanks they could give him, and he hoped the motion would be carried by acclamation.

The motion was carried unanimously.

Mr. BREMRIDGE cordially thanked the meeting for their kind expression and approval of his conduct, and he assured them that his greatest pleasure was to do everything he could that would conduce in any way towards promoting the interests of the Society.

The meeting then separated.

PROVINCIAL TRANSACTIONS.

LIVERPOOL CHEMISTS' ASSOCIATION.

The thirteenth general meeting of this body was held on the 12th of April. Donations of the Pharmaceutical Journal, from the Society, and of 'A New System of Chemical Nomenclature,' by Professor Hamilton, F.C.S., were announced by the Secretary, and the thanks of the meeting voted to the donors.

Mr. Peter Greenough, jun., of St. Helen's, was duly elected a member of the Association.

Mr. MARTIN MURPHY called the attention of the members to the work of Professor Hamilton, presented to the library. He stated that he had but a brief glance at the 'New System' since he entered the room, but brief as it was, it satisfied him that Professor Hamilton had constructed his system on an order differing almost in its entirety from any yet proposed. The only one that might, in some remote degree, compare with it was that of Laurent; and although he thought Professor Hamilton's exposition of terms, implying the composition of chemical substances, was very ingenious and indicative of much consideration, yet, like Laurent's, he feared the new system would not obtain, chiefly because the words and terms introduced were so very different from anything at present encountered in the literature of chemistry. Mr. W. H. Colby said that, in his opinion, Professor Hamilton adopted the plan analogous to that of Gray, in his 'Memoria Technica,' and other works of that type. The Vice-President felt satisfied, although he could not debate the question, not having read the work, that coming from Professor Hamilton the 'New System of Chemical Nomenclature' would be found worthy of the Professor's well-known ability.

Mr. DUTTON drew attention to the extract of stramonium, and the great disparity that existed between the new and older preparations of this medicine, the new one being very much more active. He was induced to mention the subject so as to put members on their guard when compounding prescriptions in which this medicine was ordered.

The PRESIDENT directed the attention of the members to a number of rare chemical compounds prepared by Messrs. Johnson and Matthey, of London, placed on the table, and which the Council had purchased for the museum. The Secretary described some of the more important of these bodies, and the method of their preparation. Mr. Williams likewise made some remarks on the application of some of them to photography, especially referring to the chromate of ammonia and the uranium salts.

Mr. MARTIN MURPHY, the Hon. Secretary, read the paper of the evening, entitled, "Notes on Recent French Pharmaceutical and Chemical Processes." A short discussion on some of the methods referred to in the paper was maintained, in which Mr. Mercer made particular mention of the excellence of several French preparations in a Pharmaceutical point of view, such as decoctions, tinctures, etc. A vote of thanks to Mr. Murphy concluded the business of the evening.

The fourteenth general meeting was held on the evening of April 26th; A. REDFORD, Esq., President, in the chair.

The President exhibited Dr. Richardson's spray distributer, for producing anæsthesia for surgical purposes, and illustrated its mode of operation by freezing water and other liquids by it. He gave an account of several operations where its application was attended with very satisfactory results, and entered into particulars respecting the advantages this method of producing insensibility to pain offered that rendered it preferential to chloroform. Several members volunteered remarks and suggestions respecting the effects of the instrument, several concluding that if the freezing of the muscles or parts were thoroughly effected, gangrene would ensue. Mr. Colby suggested that the "spray distributer," especially if of greater capacity than that exhibited, would be likely to prove a dangerous medium in the hands of those impelled by criminal intent, as by its powerful frigorific effects on the brain, life might be destroyed in a manner that would prove difficult to detect. He apprehended that in infancy such an effect as that shown would infallibly destroy life.

Mr. W. H. COLBY read the paper of the evening, "On Professor Hamilton's New System of Chemical Nomenclature." The author referred to the various emendations and reformations introduced into the nomenclature of chemical bodies, as chemical science advanced to its present state, and then passed in review the directing principles in those as well as in that which formed the subject of discussion. He next epitomized the chief characteristics of the new system, and entered more largely upon a consideration of its applicability and usefulness in relation to the teaching and the acquisition of a knowledge of chemistry, as not alone because the terms employed, in their combination and sound, would appear cabalistic, but because of the close relation in sound existing between the vowels generally upon which the new system so much hinged, and the liability of persons, owing to this relation, of mistaking one vowel sound for another, and so leading to a confusion subversive of all the accuracy that the facts of scientific chemical revelation enforced.

A discussion on the subject of the paper and of the reflections of the author, was maintained by Messrs. Davies, Murphy, the President, and others, after which a vote of thanks, proposed by the President in very complimentary terms, was passed to Mr. Colby for his valuable paper.

The Secretary, Mr. Murphy, then read a short paper on "Recent French Chemical and Pharmaceutical Processes." At the conclusion, the President offered some remarks on the value and importance of the facts referred to, and concluded by proposing a vote of thanks to the Secretary, which was carried unanimously.

The fifteenth and concluding general meeting of the present session was held on the evening of May 10th; A. REDFORD, Esq., President in the chair.

The following donations were announced by the Secretary, viz. 'The Pharmaceutical Journal' for May, from the Society; 'Fallacies and Incorrect Statements on the subject of the Local Submarine Forest, their Exposure and Correction,' by Rev. A. Hume, LL.D., from the author; also a donation of the following works by the Vice-President, Nathan Mercer, Esq., 'Journal of a Voyage to Australia,' by Scoresby; 'Gregory's Organic Chemistry;' 'Essays on Scientific and other subjects,' by Sir H. Holland, M.D.; 'Thomson's Animal Chemistry;' 'Chemistry no Mystery,' by Scoffern; and 'Foundation for a New Theory of Medicine,' by Thomas Innan, M.D., etc.

The PRESIDENT, in proposing a vote of thanks to the donors, desired to make special mention of the valuable collection presented by the Vice-President, to whom the Association were under great obligations for this as well as many other instances of his liberality. The vote of thanks was unanimously accorded.

The HON. SECRETARY referred to the account of the fearful and lamentable explosion of the 'European' at Colon, which had reached them some days before, and by which, besides the sudden destruction of a large amount of property, human life had been sacrificed to a fearful extent. The alleged cause was stated as glonvin or glonoine oil, which he strongly suspected to be nothing else than nitro-glycerine, one of the most violently explosive bodies known to chemists; he then entered into a description of the chemical and physical nature of nitro-glycerine, its mode of production, etc.; he considered that such bodies ought not to be designated as oils at all, as they possessed very little of the physical properties, and none of the chemical, of those true oils and fats on which the general public was knowledgeable. Unfortunately German chemists led the van in this respect, at least that they applied the generic term *öl*, or oil, to all liquids not miscible with water, and English chemists bowed acquiescence to their German teachers, although they had quite as much cause for calling ether an oil as nitro-glycerine, or rather they had no cause at all. He strongly commented upon the apathy of the press in condemning the reprehensible practice of shippers and exporters, who do not scruple, in order to cheat to the extent of the difference of freight, to pass such bodies as nitro-glycerine into the hands of thoughtless and rough-handed men, without in the least warning them of the dangers any incautiousness in their handling might lead to. The President animadverted likewise in very forcible terms on the crime—for he considered it nothing less—committed by those who, knowing the nature of those seventy cases of so-called "glonoin oil," consigned them to the care and handling of sailors, porters, and the like, without the slightest note of warning as to the manner in which the lives of such were jeopardized by it. He wondered much how those cases ever passed through Liverpool as harmless as they did, but that they were spared was cause of thankfulness to each and all. He heard that this oil was manufactured in Germany and imported into this country, in which case he thought it was the duty of the Government to at once prohibit any further importations of it. Mr. Redford then delivered his—

VALEDICTORY ADDRESS,

in which he said—"A peculiar and almost melancholy interest attaches to our present meeting. It is the last of the session, and these pleasant haunts where we have been accustomed to congregate through many a winter's night, are about to be forsaken. Such is the character of most human activities—they ebb and flow, rest succeeds to labour, relaxation to energy; they have their summer and winter, their night and day. There is a sure progression in the natural world from active life to rest, and back again to life. Such is our session of studious toil and vacation leisure, from which again we issue forth, as time rolls on, newly equipped for the battle. 'Better is the end of a thing than the beginning thereof,' says the wisest of men. And if we, at the end of our Session, can take our stand and look back with satisfaction, on a fair amount of good accomplished, we may claim to have illustrated and confirmed the sage's aphorism. It is better to accomplish a little than to plan only, better to labour than speculate, better to succeed, however moderately, than build castles in the air, make fair promises and empty boasts." He then took a review of the labours of the Session, after which he continued:—"As a whole, we may say with truth the Session has passed off well. But work is over now; the goal is attained. Myrtle and laurel wreaths alone remain for the intellectual athletæ, which we can vote ourselves at leisure. If chemists were salamanders—able to toil in the fire—and not mortals, or had they the perennial youth and indestructible vitality of their patron bird the phœnix, then perhaps the fabled renown of these creatures might become the prosaic realities of common work-day life, by our unceasing visits to these sultry halls through the long summer solstice, while the king of day rages in Leo, and baneful Sirius shoots his maddening beams on brutes and men alike! But no, we acknowledge the irresistible influence of the expanding year. Spring has draped Nature in exquisite loveliness, and philosophers must pay their annual tribute at her pleasant shrine, and leave their musty books and halls awhile. The timid swallows have ventured back from the sunny south to our sea-girt shores, and the time of the singing-birds has come; the blooming of innumerable plants tells the botanist that the desire of his heart is at hand; the hum of busy insect life is heard again, lepidoptera and coleopterous tribes are gaily on the wing, and field naturalists pursue their prizes, picnics, and collecting forays." He continued to show that the like instincts that animated the animal creation in general in the summer-time, actuated the chemist, to whom he recommended botanical study as a pleasing and invigorating intellectual exercise, while obeying this recreative law of the world, and more particularly so because of its intimate connection with the Pharmaceutical profession. When hillsides, valleys, and hedgerows proved barren in the search for certain species, he recommended the Botanic Gardens as an inexhaustible field for observation. After delivering himself of some very wholesome advice to the members in respect to the discipline they should practise as well in the economy of matinal hours, the collecting, arranging classification, and microscopical examination of specimens, etc., he continued,—"But let me briefly enumerate some of the Materia Medica which you should, if possible, during the vacation seek to familiarize yourself with—Anthemis, Hyoscyamus, Digitalis, Conium fructus et herba, the Menthas, Dulcamara, Belladonna, Ergot, Mezereon, Lavandula, Morus, Ruta, Sabina, Rosmarina, Valeriana, Uva Ursi, Ulmus, Taraxacum, Scoparia, Sinapis, Sambucus, Filix, Colchicum cormus et semen, Armoracia, Papaver Rhœas, Rosæ, and many others. Every one of these are indigenous, and if not found wild may be seen at the Botanical Gardens."

The speaker then referred to disinfectants in relation to certain maladies of doubtful origin, and advised the members to keep the subject in view that a clearer knowledge on this and other cognate matters might be attained. The chemistry of light was next considered in relation to life and the advancement of scientific research, and here the President passed a high compliment to Mr. H. S. Evans, who, he stated, "had put the Association in possession of all that was new on the subject in his recent lecture 'On the Use of the Prism in Chemical and Microchemical Investigations.'" He continued, "The magnificent intellectual feast which we enjoyed at the Conversazione, in listening to Professor Hunt, we shall never forget. The only matter of regret connected with his visit, which I feel, is that we should have been obliged, from its popular character, to accept the lecture he gave 'On the Sun and the Earth,' brilliant as it was, instead of another, which he offered us, 'On the Action of Light on Chemical and Pharmaceutical Preparations.'" In Professor Hunt's hands this subject would doubtless have proved deeply interesting and given us much valuable information. But my object now in referring to the matter, is that your attention may be directed to it during those floods of light which we may expect to enjoy in the recess, and that members may experiment with the view to bring the whole subject before us.

"One more duty alone remains to me after to-night, and that is, to preside at your Annual Meeting, in October, if spared so long. Much pleasure will it afford me to greet you here again, and greater still to realize our long-cherished hope of seeing Mr. Nathan Mercer in this chair. Sincerely do I hope that no cruel fate will mock our hopes by depriving us of his valuable services; and so, with many thanks for your kind patience, farewell."

At the conclusion of the address, a vote of thanks to the President for his able address and courteous conduct at the General Meetings of the Association, was moved in pleasing terms by Mr. John Shaw, seconded by the Secretary, Mr. Martin Murphy, and carried with acclamation; and thus the sessional term ended.

BRITISH PHARMACEUTICAL CONFERENCE.

EXHIBITION OF OBJECTS RELATING TO PHARMACY,

TO BE HELD AT NOTTINGHAM, IN AUGUST, 1866, DURING THE MEETING OF THE BRITISH PHARMACEUTICAL CONFERENCE.

It has been resolved to hold an Exhibition of Objects relating to Pharmacy, or having a special interest for members of the drug trade.

The proposal originated with the Nottingham Local Committee of the British Pharmaceutical Conference, and when laid before a meeting of the Executive Committee, held at 17, Bloomsbury Square, London, it was cordially adopted.

The British Pharmaceutical Conference will meet at Nottingham, on Tuesday, August 21st, 1866, being the time of the Meeting of the British Association for the Advancement of Science. Professor Bentley, F.L.S., etc., is the President of the Conference this year. Its proceedings usually extend over portions of three days, consisting in the reading and discussion of Papers, containing the results of the investigations of professional subjects.

From experience of the two annual meetings that have been held, in Bath and Birmingham respectively, in 1864 and 1865, it is confidently anticipated that a large number of chemists will assemble from most parts of the country.

The central position of Nottingham furnishes another important reason for holding the Exhibition at the time and place already named.

It is desired that the following classes should be represented, viz. :—

1. Objects representing novelties or improvements in pharmaceutical processes, including apparatus and utensils for evaporation, distillation, pulverization, displacement, filtration, etc. etc. Applications of gas are especially desirable. Models or drawings will also be eligible.

2. Instruments intended for use in chemical investigations, such as apparatus for volumetric analysis, spectroscopes, polarizing apparatus for testing the purity of essential oils, etc.

3. Microscopes, microscopic accessories and objects.

4. Apparatus used with a remedial intention, as galvanic and electro-magnetic machines, enemas, etc.

5. Illustrations of general business fittings, and arrangements for dispensing.

6. Improved dispensing appliances, as bottles, boxes for pills and powders, labels, etc.

7. Poison bottles, poison labels, etc. Illustrations of precautions against mistake, either by dispenser or patient.

8. Simple or compounded medicines newly introduced, or proposed for use in medicine.

9. Improved preparations for the administration of medicines of established reputation. This class would include methods for disguising nauseous remedies by means of capsules, also the various coatings of pills, also improved suppositories and pessaries, liquors and other substitutes for alcoholic tinctures. Artificial mineral waters.

10. Specimens of drugs or chemicals remarkable for fine quality, or other reasons. Specimens in botany, chemistry, etc., illustrating the source of drugs.

11. Foreign preparations, whether proprietary or otherwise.

12. Illustrations of adulterations, and the means of detecting them.

13. Improved dietetic preparations.

14. Books, either English or foreign, relating to pharmacy or collateral sciences.

15. Historical relics, having an interest in connection with pharmacy, or its cultivators, as portraits, autographs, etc. etc.

16. Any improvements in matters usually within the scope of the drug trade, or consistent with it, but which are not embraced by previous classes.

It is proposed that the Exhibition shall be open from Tuesday, August 21st, to Saturday, August 25th, inclusive.

In addition to the favourable opportunity for bringing under the notice of chemists any improvements connected with their avocation, we would especially point out that a Report upon the Exhibition will be prepared by a Special Committee, and published in the Proceedings of the British Pharmaceutical Conference. In this way extensive publicity, and that of a permanent character, will be attained.

It may be added that negotiations are now pending with the Local Committee of the British Association for the Advancement of Science, which will probably result in this Exhibition being opened upon one or more evenings to the numerous and distinguished company who attend the Conversazioni of that body.

The following regulations are to be observed:—

1. Objects for exhibition are to be delivered at Nottingham free of carriage. In cases where the exhibitor has no pecuniary interest in the articles shown, application for an exception to this rule may be made.
2. Objects are to be delivered on or before August 18th, an advice being sent at the same time by post, and an invoice of their value, stating whether intended for sale or not.
3. Descriptive accounts should accompany all apparatus, etc., requiring such.
4. The Committee will take charge of unpacking and re-packing articles sent for exhibition.
5. The Committee reserve the right to decline any objects they may consider unsuitable.

J. ATTFIELD, } *General Secretaries,*
R. REYNOLDS, } *Brit. Pharm. Conf.*
J. H. ATHERTON, *Local Secretary,*
Long Row, Nottingham.

ORIGINAL AND EXTRACTED ARTICLES.

POISONING WITH ARSENIC AND STRYCHNIA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The case of murder by Mary Ashford referred to in your last number is one of importance in a toxicological point of view, inasmuch as it exhibits the action of two poisons acting slowly upon the system at the same time.

In the comments I made in July last on the Dawlish suicide, I considered the symptoms to prove that strychnia and arsenic had been swallowed, either together or nearly so; and the former, being the most active, had killed the woman before the arsenic had begun to act, and that thus there had been neither sickness nor diarrhœa. In Ashford's case, the symptoms of poisoning by arsenic commenced on the Sunday and continued until Friday afternoon, the sickness, etc., being repeated after every feeding from his wife's hands, showing evidently that small but repeated doses were administered. On Friday, the first "fit" came on. This fit was undoubtedly a strychnic spasm; the back was arched, the eyes wild and turned upwards, the limbs extended, cramped, and rigid. Several of these attacks recurred until Saturday, 5 o'clock, when he died in a very terrible spasm; but during the Friday and Saturday the arsenical symptoms continued as well as those from strychnia, and it is evident that the murderess continued her small doses, as on Saturday morning she had mixed arsenic with the doctor's medicine, and this arsenic I found to weigh 11 grains. It is rare that arsenic is six days in destroying life, except where death is caused by ulceration of the stomach; and it is equally rare that strychnia should be nearly twenty-four hours before death occurs. I have known three cases where twelve to fourteen hours passed before terminating life, but never longer.

One part of this case, which could not be brought before the court, is worthy of notice. Mary Ashford had in her possession arsenic coloured blue, arsenic coloured black, and vermin powder, besides a packet of something which she threw into the fire the moment she was taken into custody; from whence had she the means of being so well provided with poisons? From letters left behind her, it was certain that she was in communication with persons in Exeter who, like Charlotte Winsor, are called "white witches," who will undertake any murderous work for a fee. I learnt that there were three of them in Exeter, and that one of those three was over at Honiton Clyst on the Friday before the man's death, and had a conference with the murderess, in which some dispute about money took place.

Yours respectfully,

William Herapath, Sen.,

Bristol, May 18th, 1866. *Professor of Chemistry.*

SOLUTION OF TERCHLORIDE OF GOLD.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

I have not noticed in the Journal any remark on the B.P. directions for making this solution.

The formula is sadly out of joint, yet strangely enough it is given without comment in every work on the Pharmacopœia which I have seen.

The quantity of nitro-hydrochloric acid directed to be used for dissolving the sixty grains of gold is about eight times as much as is necessary. Instead of fluid *ounces*, fluid *drachms* should be used.

The quantity of water should not be *nine*, but *five and a half* fluid ounces,—only four fluid *drachms* of it being required for diluting the seven fluid drachms of acid.

John T. Miller.

Sheffield, May, 1866.

THE BENEVOLENT FUND.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The present gratifying position of the Pharmaceutical Society, as appeared from the Report read at the late annual meeting, is calculated to afford the surest hope as regards its future increasing prosperity.

Not the least encouraging circumstance is the condition of the Benevolent Fund, both as to its amount, and also the active and meritorious use to which it has been applied during the past year. At the same time, a little disappointment may have been felt that some definite proposition had not been submitted in order to raise the amount of that fund to the sum originally intended.

I think the £10,000 should not only be kept in view, but should be made a point of special effort now that the Society is enjoying peaceful prosperity, and for a time obliged to rest on its oars as regards the Pharmacy Bill. To do this, it would appear advisable to adopt any reasonable medium calculated to make the completion of this fund the one great object of our united energies.

Various propositions have been privately suggested, one of which—a social gathering of the Members of the Society in London, with some eminent man to preside, and, *if possible*, similar gatherings held simultaneously by all the provincial associations—is worthy of weighty consideration, as tending not only to the augmentation of the Benevolent Fund, but also to promote a more friendly and fraternal feeling among the Members of the Pharmaceutical Society themselves.

But should this or other means not be practicable, one plan certainly appears to me to rise up, almost accidentally, and which would seem, in my judgment, to offer a golden opportunity in this respect. At the same time, I venture these remarks with much diffidence, as being in some degree opposed to the liberal proposal of our Vice-President, Mr. Hills, in regard to the portrait of the late lamented and highly-esteemed Mr. Jacob Bell; but, as I have but one object in view, I do not refrain, believing that Mr. Hills will be only too glad to have a public expression of opinion as to the object of his very excellent scheme.

So admirable is the object of the portrait fund, that it would meet with my unexceptionable concurrence did I not feel that the Benevolent Fund possesses a paramount claim on the members of the Society, and that the necessities of our less fortunate members in reduced circumstances, their widows and their orphan children, rise up in full force to demand that, as the Pharmaceutical Society has been so far prospered as an Institution, the Benevolent Fund, which from the first has occupied a prominent and collateral position in connection with it, should not be allowed to remain in its present unfinished condition, but that an effort to raise the amount *at once* to £10,000 should be seriously entertained, and, if possible, carried out, as a matter of duty no less than of sincere desire.

Every member would desire a portrait of Mr. Bell, and equally so all must *wish* to help the Benevolent Fund; and though to do the one and not leave the other undone may be very desirable, yet, *if depending on two distinct contributions*, the ability to perform may not, in many instances, go hand-in-hand with the will to do, while every well-wisher of the Society would regret that any member had been prevented assisting the one in his anxiety to obtain the other.

I would therefore venture to propose that an invitation should be advertised for donations to the Benevolent Fund, with the additional inducement of a portrait of a certain value to be given to donors of ten guineas, five guineas, three guineas, and two guineas, or higher or lower as may be decided on. I cannot but think that such a proposal, accompanying a strong appeal on behalf of the completion of the fund, will meet with a sympathetic and satisfactory response, —will be an object which would have had the entire approval of the late Mr. Bell, and may therefore be very pleasantly associated,—will be a means of enabling a much larger number of our members to obtain a double gratification, when in many instances they would shrink from a twofold contribution,—and will in all probability prove the best medium for raising the balance of the £10,000, and thus placing the fund in a satisfactory and more settled position. If this could be accomplished by simultaneous meetings throughout the country, so much the better, as it would thereby be completed more speedily, and produce a happy effect, perhaps, upon us who are members of the Society, as well as upon those who still remain separated from it. In addition to this, I have no doubt but that, in the large circle of acquaintance of the late Mr. Bell unconnected with pharmacy, many might desire to subscribe for his portrait, especially were it known that the proceeds were to be devoted to a benevolent object.

Should this letter at all meet your approval, its insertion in the Journal will probably draw forth a more matured expression of opinion on the subject, which is the main desire of

Your very obedient servant,

AMICUS.

London, May 19th, 1866.

SALE OF CHLORODYNE.*

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Perhaps it may interest some of your readers who, like myself, make use of a slip label for the sale of chlorodyne in small quantities, to know that the following label can be used and chlorodyne sold without affixing a Government

* See a note on this subject in our last number, page 580.

stamp on the bottle. The following letter from the Commissioners is confirmatory of the above.

Yours truly,
JOHN HURST.

Louth, May 11*th*, 1866.

"CHLORODYNE.
"Dose for a grown person, from 15 to 30 drops in water."

(COPY.)

"*Inland Revenue, Somerset House, London,*
"*2nd May*, 1866.

"Sir,—The Board have had before them your letter of the 23rd ult., requesting to be informed whether the label, a copy of which was enclosed, if affixed to a bottle containing 'Chlorodyne' would render that preparation liable to the medicine stamp duty, and in reply I am directed to acquaint you that a liability to medicine stamp duty would not be contracted by the use of the label in question. I transmit herewith for your information an extract from the Act of Parliament showing the condition necessary to constitute a liability to stamp duty in respect of preparations of this nature.

"I am, Sir, your obedient servant,
"T. SARGENT.

"*Mr. John Hurst.*"

EARLY CLOSING.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In reply to a letter in the May number, signed "A Master," I wish to say that I am doing all I can to try and reduce the hours of business to a minimum, and shall be only too happy to fall in with any useful suggestion from any Pharmaceutical Chemist.

I propose 8 P.M. for the six summer months, and 7.30 P.M. for the winter, as being reasonable hours for closing. Hoping that the subject may be agitated to some purpose,

I am, Sir, yours,
ONE IN BUSINESS.

May 18*th*, 1866.

MEDICATED PESSARIES AND SUPPOSITORIES.

TO THE EDITORS OF THE PHARMACEUTICAL JOURNAL.

Gentlemen,—I shall feel obliged if you will grant me a few lines in your Journal, in reply to Mr. Brady's remark (in your May number, page 550) on the *shape* of my *conical* medicated pessaries and suppositories, to observe that the shape of the same was determined by Dr. Greenhalgh, at whose suggestion I first gave the manufacture of pessaries and suppositories consideration, and by whom they were exhibited at the Obstetrical Society of London, in November last, since when, they have been approved of, and extensively prescribed by Dr. Arthur Farre, and many other practitioners in town and country.

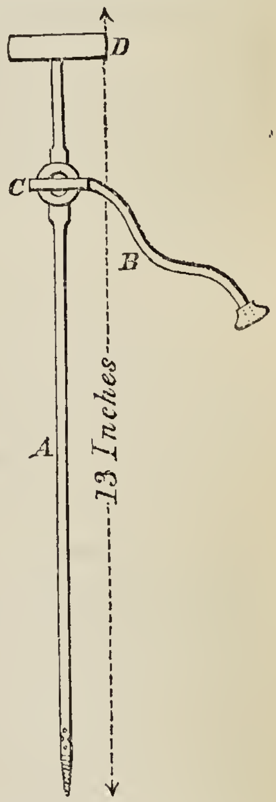
I remain, Gentlemen, your obedient servant,
JOHN L. BOSLEY.

128, *Brompton Road, S.W., May* 10*th*, 1866.

SODA-WATER TAP.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—No perfect soda-water tap is, that I am aware of, before the public; all that I have met with have faults. A gentleman, who has bought several at our establishment, one day brought me a French one that he had had lying by for a long time. He said it had but one fault, but that was fatal to its utility; it was so badly constructed that it leaked rapidly at the tap. If this tap was perfect in other respects, I thought it could not be difficult to make it sound, so I applied to Mr. John Short, mathematical instrument maker, 12, New Street, Kennington, and his practical skill has produced what I believe to be a perfect instrument. I enclose you a sketch of the tap, which he has taken for me, and it hardly needs explanation:—A is a tube pierced at the lower end with several small holes; below these holes a solid screw is riveted in, for the purpose of boring through the cork. B may be said to be a continuation of A, and serves to give a proper direction to the aërated fluid after it has passed the tap. C is the tap, on the perfection of which the chief value of the apparatus depends; at all events, an imperfect tap would completely nullify the other advantages the instrument possesses. D is a handle of hard wood or ivory, fixed on a solid continuation of the tube A. The instrument, when electro-plated and polished, has a very nice appearance, and, being all in one piece, nothing can be lost. I will not pretend to advance any theory in support of the advantages derived from a long tube reaching to the bottom of the vessel to be emptied; it might be met by an assertion, that as the pressure is the same in all parts of the vessel it could make no difference whether the tube be long enough to reach the bottom or only just to pierce the cork, and to this assertion I do not think I could find a satisfactory reply; I therefore limit myself to stating that in practice the long tube is found to have the advantage.



I have given Mr. Short's address, because, as he has succeeded so well, I have no doubt there are others who will be glad to avail themselves of his services.

I have a word or two upon the present adulterations of carmine, and also upon the action of zinc on olive oil; but as I have perhaps already exceeded the space at your disposal, I will reserve them for another occasion.

I am, Sir, your obedient servant,

Upper Sydenham, near London. J. H. HOLLOWAY.

THE LATEST THING IN FEEDING-BOTTLES.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—In the Journal for April, under this heading, a correspondent at Scarborough drew attention to the lamentable state into which trade is falling in the north of England, illustrating his remarks by informing us how they manage the sixpenny feeder trade there. The statement made by your correspondent appears to have been received with much incredulity; but, Sir, I can vouch for its accuracy in several respects.

In this town fittings for sixpenny feeding-bottles may be had for *threepence,* and spare bottles for *twopence,* so that a sixpenny feeding-bottle can be purchased for *fivepence,* and in some cases fourpence-halfpenny. *O tempora! O mores!* "Where are we drifting?" I can understand the oil-shop chemists cutting down the prices of everything—but Pharmaceutical Chemists? Faugh! I put it to the trade generally, and more particularly to members of the Society, is it consistent with the dignity of a noble and enlightened profession thus to enter into competition with such recreants? For my own part, I think it advisable to abandon the sixpenny feeder trade, and let it go to those chemists and druggists whose minds are on a level with the pennyworths of blacking, snuff, hair oil, etc., they delight in vending.

Whilst I write, my risible faculties have been excited to their utmost tension by sight of a "feeding-bottle" which a woman has brought in to be fitted with a "penny india-rubber teat." An ingenious chemist in the town had contrived to insert a bung into the mouth of a *male glass urinal*, and, with the addition of the ordinary fittings, had produced for *threepence* a feeding-bottle, which, if not altogether sightly, had at least the merit of combining the flat with the upright.

I leave these facts to the consideration of your readers, and remain, Sir,

Yours very truly,

Sheffield. PHARMACEUTIST.

RHIGOLENE,* A PETROLEUM NAPHTHA FOR PRODUCING ANÆSTHESIA BY FREEZING.

[Read before the Boston Society for Medical Improvement, April 9th, 1866,† and communicated for the 'Boston Medical and Surgical Journal.']

BY HENRY J. BIGELOW, M.D., PROFESSOR OF SURGERY IN THE MASSACHUSETTS MEDICAL COLLEGE.

The above name is proposed as convenient to designate a petroleum naphtha boiling at 70° F., one of the most volatile liquids obtained by the distillation of petroleum, and which has been applied to the production of cold by evaporation. It is a hydrocarbon, wholly destitute of oxygen, and is the lightest of all known liquids, having a specific gravity of 0·625. It has been shown that petroleum, vaporized and carefully condensed at different temperatures, offers a regular series of products which present more material differences than that of their degree of volatility,‡ and that the present product is probably a combination of some of the known products of petroleum with those volatile and gaseous ones not yet fully examined, and to which this fluid owes its great volatility. A few of these combinations are already known in trade, as benzolene, kerosene, kerosolene, gasolene, etc., all of them naphthas, but varying with different manufacturers. I procured, in 1861, a quantity of kerosolene§ of four different densities, and found the lightest of them, the boiling-point of which was about 90°, to be an efficient anæsthetic by inhalation.|| When it was learned here that Dr. Richardson, of London, had pro-

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* Rhigolene, from ῥιγος, *extreme cold,* to which is added the euphonious termination of most of the other petroleum naphthas.

† About three weeks after my first experiments with rhigolene, I first learned that Prof. Simpson, of Edinburgh, had lately employed "kerosolene" for this purpose.

‡ See Researches on the Volatile Hydrocarbons, with references to authorities, by C. M. Warren. American Journal of Science and Arts, July, September, and November, 1865.

§ The kerosolene was furnished by Mr. Merrill, Superintendent of the Downer Kerosene Oil Co., South Boston.

|| An account of these experiments may be found in this Journal, July 11, 1861. Reference is made to them in a paper "On the Most Volatile Constituents of American Petroleum," by Edmund Ronalds, Ph.D., in the Journal of the Chemical Society, London, February, 1865. Mr. Ronalds there states that "the most volatile liquid obtained by collecting the first runnings from the stills employed in the process of refining petroleum has a specific gravity of 0·666." He had also received a specimen of "kerosolene" from Prof. Simpson, of Edinburgh, at 0·633. It will be observed, that the Rhigolene has a specific gravity of 0·625.

duced a useful anæsthesia by freezing through the agency of ether vapour, reducing the temperature to 6° below zero F., it occurred to me that a very volatile product of petroleum might be more sure to congeal the tissues, besides being far less expensive, than ether. Mr. Merrill having at my request manufactured a liquid of which the boiling-point was 70° F., it proved that the mercury was easily depressed by this agent to 19° below zero, and that the skin could be with certainty frozen hard in five or ten seconds. A lower temperature might doubtless be produced, were it not for the ice which surrounds the bulb of the thermometer. This result may be approximately effected by the common and familiar "spray producer,"* the concentric tubes of Dr. Richardson not being absolutely necessary to congeal the tissues with the rhigolene, as in his experiments with common ether. I have for convenience used a glass phial, through the cork of which passes a metal tube for the fluid, the air-tube being outside, and bent at its extremity so as to meet the fluid-tube at right angles, at some distance from the neck of the bottle. Air is not admitted to the bottle as in Dr. Richardson's apparatus, the vapour of the rhigolene generated by the warmth of the hand applied externally being sufficient to prevent a vacuum and to ensure its free delivery; 15° below zero is easily produced by this apparatus. The bottle, when not in use, should be kept tightly corked, a precaution by no means superfluous, as the liquid readily loses its more volatile parts by evaporation, leaving a denser and consequently less efficient residue. In this and in several more expensive forms of apparatus in metal, both with and without the concentric tubes, I have found the sizes of 72 and 78 of Stubs's steel wire gauge to work well for the air and fluid orifices respectively; and it may be added that metal points reduced to sharp edges are preferable to glass, which, by its non-conducting properties, allows the orifices to become obstructed by frozen aqueous vapour.

Freezing by rhigolene is far more sure than by ether, as suggested by Dr. Richardson, inasmuch as common ether, boiling only at about 96° instead of 70°, often fails to produce an adequate degree of cold. The rhigolene is more convenient and more easily controlled than the freezing mixtures hitherto employed. Being quick in its action, inexpensive and comparatively odourless, it will supersede general or local anæsthesia by ether or chloroform for small operations and in private houses. The opening of felons and other abscesses, the removal of small tumours, small incisions, excisions and evulsions, and perhaps the extraction of teeth, may be thus effected with admirable ease and certainty; and for these purposes surgeons will use it, as also, perhaps, for the relief of neuralgia, chronic rheumatism, etc., and as a styptic, and for the destruction by freezing of erectile and other growths. But for large operations it is obviously less convenient than general anæsthesia, and will never supersede it. Applied to the skin, a first degree of congelation is evanescent; if protracted longer, it is followed by redness and desquamation, which may be possibly averted by the local bleeding of an incision; but if continued or used on a large scale, the dangers of frost-bite and mortification must be imminent.

It may be superfluous to add that both the liquid and the vapour of rhigolene are highly inflammable.

PHOSPHORUS PILLS.

Dr. Radcliffe having tried various means of administering phosphorus, has at length succeeded in effecting this in the form of pills; and as other medical men are now ordering phosphorus in this form, we have thought it desirable to publish the formula, for the information of our readers.

Take of
Phosphorus . . . 6 grains.
Suet . . . . . . 600 grains.

Melt the suet in a stoppered bottle capable of holding twice the quantity indicated; put in the phosphorus, and when liquid, agitate the mixture until it becomes solid; roll into 3-grain pills, and cover with gelatine. Each pill will contain $\frac{1}{33}$ of a grain of phosphorus.

* Bergson's tube.

LOCAL ANÆSTHESIA.

Several communications have recently appeared in the medical journals on this subject, by Dr. Richardson. The details are too exclusively medical for our pages, but we may observe that anæsthesia has been produced by the employment of ether in the form of a very fine spray; and this is effected by the use of a modification of Bergson's hand-ball spray producer. The ether used by Dr. Richardson, in his experiments, is a pure rectified ether of 0·720 specific gravity, made by Mr. Robbins, of Oxford Street. Various other agents, such as methylic ether, amylene, monochloretted chloride of ethyle, pure chloric ether, nitrite of ethyle, chloroform, rectified turpentine, and numerous compounds and mixtures have been tried by Dr. Richardson, but we believe that better results have been obtained by the use of pure ether.

NOTE ON RECTIFIED OIL OF AMBER AS A REMEDY FOR HÆMORRHOIDS.

BY WILLIAM PROCTER, JUNIOR.

Of the large number of persons who suffer from this annoying complaint, very many never consult a physician, and many others after renewed treatment give up the idea of becoming cured, viewing the affliction like some do old ulcers, as a burden to be borne while life continues. Various external applications are constantly prescribed, as an ointment of acetate of lead, tannin or nutgall, and opium, which is often successful in affording relief. Numerous secret nostrums have, from time to time, attracted attention, indicating the prevalence of the disease. Several years ago my curiosity was excited by the repeated calls for rectified oil of amber by a person who was not in any way connected with medicine, and he was asked the use to which it was applied. He said it was for piles, and that he rarely knew it to fail, the numerous calls that had been made being for friends and acquaintances who were sufferers from the complaint. After that, on several occasions where opportunity offered, it was suggested and tried with success, in many cases of piles where the tumours were external and annoying. The manner of its curative action I am not aware of. The oil is applied as a lotion to the tumours, and around the anus where the swellings exist. It occasions a smarting sensation at first, but after several applications the sensitiveness disappears, and the tumours are dissipated. So far as is known to the writer the influence is entirely local, and does not extend beyond the parts to which it is applied. I am not aware that it has been applied beyond the sphincter ani to the internal tumours, but know of a case wherein both internal and external piles existed, the latter disappearing, and the others continuing to give annoyance. The object of this note is to ask the attention of medical men to the subject, that the actual value of the oil of amber as a remedy for piles may be satisfactorily tested. It may be that in some cases admixture with lard or cerate would be preferable, and in the form of an emulsion, or associated with glycerin or olive oil, it might be applied in the rectum by injection or by a bougie. These are mere suggestions to the physician.

It is to be regretted that so little genuine oil of amber is to be obtained, as has been conclusively shown by Mr. Ebert, of Chicago, who finds that it costs as much per ounce to make the oil as it sells for in commerce per pound. Failures may be attributed to the spurious oil made from turpentine and coal oil, shaken with oil of tar and some oil of amber.—*American Journal of Pharmacy.*

PIMENTO.

All the pimento which arrives in Great Britain comes from Jamaica, and is the produce of *Eugenia pimenta*, Dec., *Pimenta vulgaris*, Lindl. An inferior species (*E. acris*) with larger berries, grows in the island of Tobago, and is occasionally imported into France. Jamaica enjoys a monopoly of this product. Every attempt to carry the seed to St. Domingo and Cuba, and to propagate it there, has failed, and though the tree is found in Yucatan, the fruit is not exported thence.

The small, dry, reddish-brown berry is sometimes called Jamaica pepper, and often allspice, from its taste and flavour (qualities which reside chiefly in the cortical part of the berry) being supposed to resemble that of a mixture of cloves, cinnamon, and nutmegs. Its properties are chiefly due to a volatile oil. The pimento walks are situated in the mountains, on the north side of the island, where the trees grow in hundreds. It is a white-trunked, shapely tree, not unlike in shape and growth an English apple-tree, but with a thicker, richer foliage, and dark glistening leaves, aromatic, like its fruit, and resembling those of the myrtle, to which family it belongs. The trunk is white, because every year the bark strips. Nature seems to have intended that some useful purpose should be served by the bark, but hitherto it has not been made available commercially. The tree blossoms twice, but only bears once a year. The blossom that holds and sets to fruit appears in April. The trees form the most delicious groves that can possibly be imagined, filling the air with fragrance, and giving reality, though in a very distant part of the globe, to the poet's description of those balmy gales which convey to the delighted voyager—

> "Sabean odours from the spicy shore of Araby the blest,
> Cheered with the grateful smell, old ocean smiles."

The tree grows spontaneously, and seems to mock all the labours of man in his endeavours to extend or improve its growth, not one attempt in fifty to propagate the young plants, or to raise them from the seeds, in parts of the country where it is not found growing spontaneously, having succeeded.

The usual method of forming a new pimento plantation (in Jamaica it is called a walk) is nothing more than to appropriate a piece of woodland, in the neighbourhood of a plantation already existing, or in a district where the scattered trees are found in a native state, the woods of which being fallen, the trees are suffered to remain on the ground till they become rotten and perish. In the course of twelve months after the first season, abundance of young pimento plants will be found growing vigorously in all parts of the land, being, without doubt, produced from ripe berries scattered there by the birds, while the fallen trees, etc., afford them both shelter and shade.

At the end of two years it will be proper to give the land a thorough cleaning, leaving such only of the pimento-trees as have a good appearance, which will then soon form groves, and, except for the first four or five years, require very little subsequent attention.

In July and August, soon after the trees are in blossom, the berries become fit for gathering, the fruit not being suffered to ripen on the tree, as the pulp in that state being moist and gelatinous, is difficult to cure, and, when dry, becomes black and tasteless. It is impossible, however, to prevent some of the ripe berries from mixing with the rest, but if the proportion of them be great, the price of the commodity is considerably injured.

It is gathered by the hand. One labourer on the tree, employed in gathering the small branches, will give employment to those below (who are generally women and children) in picking the berries, and an industrious picker will fill a bag of seventy pounds in a day. It is then spread on a terrace, and exposed to the sun for about seven days, in the course of which it loses its green colour, and becomes a reddish-brown, and when perfectly dry it is passed through a fanner, bagged, and is ready for shipment. The term sometimes used to denote the in-gathering of the crop is not picking, but "breaking," because, with each cluster of berries a portion of the branch is broken off, the tree thriving all the better for the spoliation.

The returns from the pimento walk in a favourable season are prodigious. A single tree has been known to yield 150 lbs. of the raw fruit, or 1 cwt. of the dried spice, there being commonly a loss in weight of one-third in curing; but this, like many other of the minor productions, is exceedingly uncertain, and perhaps a very plenteous crop occurs but once in five years.

Before the war with Russia there was a large demand for pimento in that country, for use in spiced bread, but during the blockade it was found that a tree growing on the banks of the Amoor, yielded a bark which, when grated, was pungent enough to supply the pepper, and aromatic enough to yield the spice, and the Russian market was thus lost. Pimento is used as a spice in cooking, and in medicine in weak digestion, to relieve flatulency, etc. The dried fruit and flower-buds of *Myrtus communis* were formerly used as a spice, and are said to be so still in Tuscany.

Pimento exists in sufficient abundance in many parts of the parish of Hanover, Jamaica, but the price has frequently fallen so low as 1½*d.* per lb., making it scarcely worth the expense of picking. From Hanover there were shipped 7100 lbs. in 1855, 8800 lbs. in 1856, 67,644 lbs. in 1857, and 184,459 lbs. in 1858.

In 1850, 1022 tons of pimento were imported into the United Kingdom; in 1855, 2115 tons, of which 1200 tons were re-exported; in 1860, the imports were 1000 tons, and in 1865, 1279 tons.—*Technologist.*

EXPLOSION OF NITRO-GLYCERINE.

By the Royal Mail Company's steamer 'Shannon,' which reached Southampton on Saturday, April 28th, we have news of the destruction of another vessel belonging to the fleet of the West India and Pacific Company—the 'European.' The steamer blew up alongside the wharf at Colon, near the railway station on the Atlantic side of the Isthmus of Panama, and the captain, the chief officer, the second officer, the surgeon, and nearly all the crew, were killed on the spot. Among the cargo was a quantity of nitro-glycerine, an explosive oil, some seventy cases of which had been shipped from Liverpool for California, for use in blasting. It is supposed that one of these cases ignited, or exploded by concussion; and as the explosive force of nitro-glycerine is said to be much greater than that of gunpowder, the result was a tremendous shock, which destroyed the wharf, with property valued at $1,000,000, and was fatal to many persons ashore as well as to those on board the 'European.' When the Royal Mail steamer 'Tamar' left Colon, the number of those who lost their lives had not been accurately ascertained, and the estimate varied from fifty to eighty persons. 'The Panama Star and Herald,' in describing the effects produced by this explosion, states that the wharf at which the vessel was unloading, and which was about 400 feet long, was literally torn to pieces, and that scarcely a building in the whole place escaped without more or less damage. A second explosion took place, more violent than the first, but fortunately Captain Moir, of the Royal Mail steamship 'Tamar,' had previously, with great courage, towed out the burning vessel to the opposite side of the bay. The origin of the explosion is not known, the officers and nearly all the crew having perished, but it is supposed by some to be the result of spontaneous decomposition; nor is it known whether the officers were aware of the explosive properties of the oil which made up so large a proportion of the cargo. At a meeting of the Mersey Dock Board, Liverpool, it was stated, that the packages had been forwarded from Germany to Hamburg, thence to Hull, and from thence to Liverpool, as ordinary merchandise. It appears that the Board, at present, have only the power of inflicting a fine in cases where goods are insufficiently described. But from a conversation which took place in the House of Commons on the subject, a Bill will shortly be brought in to make such acts criminal.

TESTS FOR CARBOLIC ACID.

The following communication from William Crookes, F.R.S., has appeared in the 'Times:'—

The Cattle Plague Commission have recommended carbolic acid as a disinfectant, and it is now extensively used as such. A spurious article composed of oil of tar, utterly valueless as a disinfectant, is now being imposed on the public. The iniquity of this fraud claims exposure, and I beg, through your assistance, to direct public attention to the fraud, as well as to the means by which it may be detected.

Commercial carbolic acid is soluble in from 25 to 70 parts of water, or in twice its bulk of a solution of caustic soda, while oil of tar is nearly insoluble. To apply these tests:—1. Put a teaspoonful of the carbolic acid in a bottle; pour on it half a pint of warm water; shake the bottle at intervals for half an hour; when the amount of oily residue will show the impurity. 2. Dissolve one part of caustic soda in ten parts of warm water, and shake it up with five parts of the carbolic acid. As before, the residue will indicate the amount of impurity.

These tests are not given as having any pretension to scientific accuracy, but as affording persons who are desirous of using carbolic acid a rough and ready means of seeing whether or not they possess the right article.

METHOD OF RECOVERING BISMUTH FROM SOLUTION.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The following simple process for removing bismuth from the very dilute solutions obtained during the preparation of the various salts of that metal may prove useful to some of your readers.

If the liquid be not already acid, it is to be made so by the addition of a few drops of hydrochloric acid, and some pieces of pure zinc added; in a few hours the whole of the bismuth will be thrown down in the metallic form, and in a finely divided condition eminently fitted for re-solution in nitric acid.

The precipitation is so complete that the addition of sulphuretted hydrogen to the acidified supernatant fluid produces only a slight cloudiness; this test may serve as a register of the completion of the reaction.

The above process, which is identical in principle with one which has been long used for recovering the silver from the waste solutions of photographers, was suggested to me by observing the effect of accidentally pouring the washings from "the manufacture" of "Liquor Bismuthi" over an iron spatula.

I may perhaps be allowed to take this opportunity of acknowledging the courtesy of Mr. Albert E. Ebert, in forwarding to me a number of the 'American Journal of Pharmacy,' containing a paper of his on the 'Preparation of Liquor Bismuthi,' which subsequently appeared in your number for March, and also of owning the justice of the corrections therein contained of certain inaccuracies in a former communication of mine to you, on the same subject.

I am, Sir, your obedient servant,

THOMAS P. BLUNT, B.A. OXON., F.C.S.

The Wyle Cop, Shrewsbury, April 17, 1866.

SOLUBLE BOUGIES.

In the 'Lancet' of May 12th will be found an account of a novel treatment of gonorrhœa and gleet, by Mr. Henry Thompson, from which we extract the following:—

"We have been interested lately in observing a new process which is now being tried by Mr. Henry Thompson at University College Hospital, and which may possibly be found of much service. Believing that the imperfect action of injections depends upon the very short time that they are in contact with the mucous membrane, Mr. Thompson conceived the idea of applying the astringent in such a form as would enable it to remain for a much longer period in contact with the inflamed surface. Under his direction Messrs. Bell and Co. have constructed 'soluble bougies,' two or three inches in length, made of cacao butter, containing the drug it is wished to apply. They are cast in moulds, are perfectly firm and smooth, and may be used in any length, but that named has been deemed the best. A soluble bougie is equal in size to about No. 8 or 9 of the catheter scale, and may be introduced (having been previously oiled) by the patient himself into the urethra, where the material gradually melts in the space of about ten minutes. The patient is directed to slip one of these bougies into the passage on going to bed.

"After trying many methods for retaining the bougie *in situ*, Mr. Thompson has adopted the following:—A piece of adhesive plaster is cut, nearly an inch wide and five inches long. A piece of Taylor's stout lint, of the same size, is rolled up into a little pad and laid on the centre of the plaster, which is warmed, and applied along the lower surface and dorsum of the penis, the prepuce meanwhile being fully retracted. A second strip of plaster, half the width of the first, is then put closely around the glans penis transversely. The bougies are made to contain either a quarter of a grain of nitrate of silver, a grain of tannin, two-thirds of a grain of acetate of lead, or ten grains of nitrate of bismuth, as astringents; while others are sedative also, and contain two grains of opium, or two of belladonna. Other materials can, of course, be employed. By this plan Mr. Thompson has satisfied himself that the active agent is kept for several hours in contact with the urethral surface, and is, moreover, necessarily squeezed into the lacunæ, which often, doubtless, escape being acted upon by injections."

NOTE ON OLEORESINA CUBEBÆ.

By William Procter, Junior.

The purpose of this note is twofold,—to point out an imperfection that occurs in some of the commercial specimens, and which materially injures the value of the preparation, and to offer a few remarks in reference to its manufacture. By the officinal process the powdered cubebs is exhausted by percolation with ether, that is to say, for every 12 troy ounces of cubebs 24 fluid ounces of percolate is obtained. The percolate is then made to yield 18 fluid ounces of ether, by means of a water-bath still and a good refrigeratory, after which the residue is exposed in a capsule until the remaining ether has evaporated. It will be proper to remark, by way of illustration, that cubebs contain volatile oil, soft resin, cubebin and waxy matter, that are soluble in ether, and all of these, except the latter, are more or less active. When carefully made, oleoresin of cubebs has a dark green colour, varying from dull green to deep grass-green, according to the condition of the cubebs treated, that is to say, according as the berries contain more or less chlorophylle, due to their greater or less ripeness when collected. The specific gravity of the oleoresin is not uniform, owing to the variable proportion of volatile oil in cubebs, and to its more or less perfect freedom from the last portions of the menstruum used; and this brings me to the imperfection alluded to in the beginning of this note. It has repeatedly occurred that the oleoresin purchased of druggists has a decided ethereal odour, is quite thin in consistence, and sometimes has a considerable quantity of crystals of cubebin in a separate state, either floating in the liquid or adhering to the sides and bottom of the phial. Now, the presence of ether is objectionable as a dilutant, as facilitating the crystallization and separation of the cubebin by thinning the oleoresin, and lastly, from altering its medical properties; and the apothecary should either return the preparation as imperfect, or, submitting to the loss, expose it in a capsule until the ether evaporates. One specimen, bought as genuine, when thus treated, lost three-eighths of its weight by spontaneous evaporation in a short time! As regards the separation of the waxy matter and cubebin, the former tends to deposit first, and the cubebin afterwards, with more of the wax. This occurs in the most carefully prepared specimens, but the separation occurs more slowly when the concentration is perfected at once in a distillatory apparatus with a regulated heat, than by gradual spontaneous evaporation. The high price of ether has suggested the idea of using other and cheaper solvents, as alcohol, bisulphuret of carbon and benzole; and I have recently tried the purest commercial "benzine," which, when dropped on paper, left no odour after a few moments' exposure to the air, and, so far as the quality of the preparation is concerned, it affords an excellent preparation, less disposed to deposit than either the alcoholic or ethereal oleoresin. The product is greatest by alcohol, owing to the removal of more extractive matter probably.

The following results were obtained with ordinary ether of commerce, sp. gr. ·750, with stronger alcohol that had been shaken with carbonate of potassa, and with good benzine of sp. gr. ·705. In each experiment 1000 grains of cubebs was packed closely in a conical percolator arranged for volatile fluids, and the several menstrua poured on until the bulk of 1000 grains of water at 60° F. was obtained; the receivers were then changed, and the percolations continued until an additional quantity of percolate from each was obtained; the specific gravity of the several first liquids was then taken, and afterwards each of them evaporated in a warm place till they ceased to lose weight. The second liquids were then evaporated. The results are exhibited in the following tabular view:—

Cubebs treated.	Menstruum used.	Quantity of 1st percolate in grain measures.	Oleoresin yielded.	Quantity of 2nd percolate.	Oleoresin yielded.	Total oleoresin.	Percentage.
1000 grs.	Ether.	1000	205	1000	14	219	21·9
1000 grs.	Alcohol.	1000	240	1000	30	250	25·0
1000 grs.	Benzine.	1000	140	2000	25	170	16·5

The products by alcohol and ether were both cloudy, from a portion of deposited matter, whilst that by benzine remained clear and free from deposit. The specific gravity of these products varied; that from benzine was ·9325, that by ether ·9675, that by alcohol ·9850; whilst the commercial sample alluded to as containing ether, was only ·9000, with a deposit of cubebin in the phial. The trials were at the temperature of 76° F. To determine whether the benzinic dregs contained matter soluble in ether, a portion of the latter was poured on the dregs until the absorbed benzine was displaced, when the percolation with ether was continued until 1000 grains had passed. It had a green colour, and on evaporation yielded a residue of 28 grains, consisting chiefly of cubebin, with a little waxy matter and chlorophylle, but no volatile oil, and but little pungent resin. Cubebin appears to be but slightly soluble in benzine, and until it be settled that it has no medicinal virtue, it will not do to employ benzine as a solvent in making oleoresin of cubebs.

From these results it is apparent that nearly the whole of the oleoresin is removed in the first percolate, and that 1000 grains measures of ether in the second only produced one-fourteenth as much of oleoresin. As this applies equally to all, it points to the propriety of stopping the percolation earlier, and sacrificing the little oleoresin left in the dregs.—*American Journal of Pharmacy.*

THE ACTIVE PRINCIPLES OF HELLEBORUS.

The physiological experiments hitherto instituted with hellebore and its various preparations, have only been made on animals, and as it appears, up to within a few years ago, with much uncertainty as to the species employed by the experimenters. The older statements probably refer all to *Helleborus viridis.* Vulpian, Koelliker, Pelikan, and others, assume an immediate tendency to the heart, Schroff also an irritating narcotic action. Marmé and Husemann, who have lately separated several proximate principles of *H. viridus*, *niger* and *fœtidus*, make the subjoined statements with reference to the physiological action of those principles.

The root and lower leaves of the three species named contain originally two non-volatile active principles, of the nature of glucosides, to which the authors have given the names *helleborein* and *helleborin;* in addition *H. fœtidus* probably also contains a third volatile principle. The two substances named act as poisons on all animals, and presumptively, on man; while the product of their decomposition by acids are without any effect on the animal organism. The so-called oil of hellebore described by Feneulle and Capron, when freed from those glucosides, may be taken in considerable doses without untoward effects. It is remarkable that the helleborein from the green species is much more active than that of *H. niger*, and probably of *H. fœtidus.* This substance shows a characteristic indifference to chemical agents, alkalies, or ferments, but is readily soluble, and for both reasons, easily absorbed, with a decided local action, although not an irritating one on the epidermis; on the other hand, it strongly irritates mucous membranes. The conjunctiva, when it is applied, reddens, swells with enlarged secretion, and, indirectly, enlargement of the pupil. On the mucous membrane of the nasal canal it causes sneezing, but not to the same degree with veratria. The salivary glands are excited by it, not only upon direct application, but also when it enters the general circulation. Small doses produce no effect on the stomach, but when accumulated they cause loss of appetite, nausea, even to emesis, pain, enlarged secretion, and gastro-enteritis. The kidneys likewise experience a stimulating effect, and the female genitalia are also affected. Very small doses act on the heart very much in the manner of digitalin, retarding the circulation, while in large doses it accelerates the same, often to fatal rapidity. There may also exist both gradual paralysis and convulsion.

The other glucoside, helleborin, is less soluble in water, but a more active poison when given in small doses, though less irritating to the mucous membrane. Its action on the tongue is similar to that of aconite. The nervous system is peculiarly affected by this substance. In measure with the dose and the susceptibility of the animal, it caused a greater or less degree of nervous excitement, beginning with accelerated breathing, great unrest, tension and trembling of the muscles, great depression, uncertain movements, then retardation of breathing and pulsation, irritability of the nerves of the periphery, strong enlargement of the pupil, the acoustic nerve insensible, finally almost complete anæsthesia, also strong hyperæmia of the brain and spinal marrow, and even apoplexia. Otherwise its action is similar to other narcotics.

The very decidedly poisonous properties of *H. fœtidus*, which contains less of the second glucoside, is most probably due to a volatile principle, together with the true narcotic principle, helleborein.—*Druggists' Circular*, April, 1866, p. 90.

WHY DO BEES WORK IN THE DARK?

BY CHARLES TOMLINSON, F.C.S.

About two years ago a paragraph appeared in the 'Chemical News' (April 30, 1864), and went the round of the papers, under the title of "Why Bees Work in the Dark," in which it was stated (1) "that the change of honey from a clear yellow syrup to a solid mass is 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, causes the syrupy honey to assume a crystalline form." In proof of this, M. Scheibler enclosed honey in stoppered flasks, some of which were kept in the dark while others were exposed to the light, when it was found that the sunned portion rapidly crystallized, while the honey kept in the dark remained perfectly liquid. (2.) "We now see," he says, "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 hives."

While I was on a visit to a village on the Dorsetshire coast at the end of July, 1864, some new combs were brought in containing virgin honey, when it occurred to me to test the observation on which the above theory is founded, and the more so since the remark that "light determines the formation of camphor and iodine crystals in a bottle," I knew to be erroneous. Accordingly, I collected a small quantity of this new honey in two bottles, and wrapped one of them in several folds of stout paper, and left the other exposed. On my return to town early in August I placed the bottles in an east window, where they remained many months exposed to the cold of winter and the sun of spring, with the temperature often below freezing-point, and on warm days above 70° Fahr. The honey in both bottles remained quite fluid, and the only change was the deposit in each bottle of a few bright crystalline grains.

A still more perfect experiment was made in July, 1865. Being in the same Dorsetshire village, I procured some virgin comb that had never seen the light, squeezed it gently through clean linen, and received the stream of pure limpid honey into two eight-ounce white glass bottles. When these were nearly filled the stoppers were inserted, tied over, and the bottles labelled. One was wrapped up in opaque paper, and the other was, a few days afterwards, exposed to the light on a window-frame, where it has remained ever since, exposed to the direct sunshine of summer, and to the cold of winter; but the honey, whether exposed to the light or covered, remains perfectly limpid after about eight months.

A bottle of honey from Rosenthal, in Switzerland, was procured from Messrs. Fortnum and Mason. This, they said, was three years old, and improved by keeping. It was in a bottle of light-green glass, and had been in their shop window for a long time. I transferred a portion of this honey to a white-glass bottle, and it has been exposed to the light for about ten months, and is still (February, 1866) quite fluid.

Virgin honey from Bromborough Pool, near Birkenhead, exposed to the light during many months, remains quite fluid; but old honey, *i. e.* gathered from combs of the second year, whether exposed to the light or not, soon became solid. So also honey from near Dunstable, gathered from a new comb, became solid, contrary to the above experience, whether exposed to the light or not.

These facts sufficiently prove that "the sunned portions" of virgin honey do not always "rapidly crystallize."

The specimens of new honey, then, had, with one exception, not solidified after many months' exposure. I endeavoured to bring some Dorsetshire honey into the candied state by placing it in a capsule over sulphuric acid under the receiver of an air-pump. The honey thus operated on was taken from a jar prepared in the usual way by steaming the combs; it was darker in colour than that exposed to the light, but still quite fluid. It was kept *in vacuo* about a fortnight; the pump was worked two or three times a day, and at each working there was a disengagement of air-bubbles, as if a slight fermentation had been going on in the honey, but it did not candy. The capsule was now placed on the window ledge by the side of the bottles containing the virgin honey. It was left exposed to the air during some weeks, in which time it not only did not candy, but increased in bulk to overflowing, thus proving the presence of some deliquescent material.

Acting on this idea, I weighed out 100 grain portions of honey from different sources into watch-glasses, and exposed them on the window-ledge. They all absorbed moisture more or less, and the absorption was greatest in damp weather, but in very unequal proportions; for while Normandy honey absorbed 8½ grains of moisture, Minorca honey absorbed only 3½ grains, and when the former weighed 103½ grains the latter had actually lost weight, the 100 grains being only 99½ grains. The Dorsetshire honey was by no means so absorptive as the Rosenthal, but in all four cases that were tried there was absorption of moisture during damp weather, and loss of moisture during dry; showing, in fact, the presence, in greater or less quantity, of deliquescent salts in the honey.

Remembering the fondness of bees for salt water, it seemed probable that the difference between the Dorsetshire honey and the Hertfordshire honey might arise from the fact that the one contained a minute proportion of salt, or of the salts of sea water, which was absent in the other.

The fondness of bees for salt has long been a puzzle to entomologists. Dr. Bevan, in his work on "The Honey Bee," says:—"I keep a constant supply of salt-and-water (about a teaspoonful to a pint) near my apiary, in a shallow dish, covering the bottom with small pebbles, and find it thronged with bees from early noon to late in the evening. About this period (*i. e.* the spring) the quantity they consume is considerable, but afterwards they seem indifferent to it." In the volume on bees contained in Sir William Jardine's 'Naturalists' Library,' it is stated, p. 49, that "bees have recourse in spring, but generally speaking in spring only, to dunghills and stagnant marshes for the sake of the salts with which they are impregnated, and which their instinct teaches them are advantageous to their health after their long winter confinement."

It seemed more probable that bees collect small portions of salt for the purpose of keeping their honey fluid than for the purposes of medicine, as suggested by the last quotation. To test this, two portions of 120 grains each of the candied Hertfordshire honey were scraped from a spatula upon the edges of two evaporating-dishes; one specimen was sprinkled with about 2 grains' weight of marine salts, such as are used for making artificial sea-water. In the course of a few hours this honey showed signs of liquefaction, although the weather was cold; and in the course of two or three days it had run down into the dish in a liquid form, so that it could be poured. The honey in the other dish continued for weeks adherent to the edge, showing much less decided signs of liquefaction.

The examination of various specimens of honey did not confirm this view, but it led to the detection of a variety of salts, among which lime was particularly abundant, especially in honey from inland places. Potash was also found in considerable quantity, and this would tend to make the honey deliquescent. As far as my examination has extended, nothing seems to explain why some varieties of new honey become candied sooner than others. The presence of lime does not seem to explain anything, except that bees may introduce a good deal of filth into their honey; for the lime was probably gathered in the form of nitrate, which is an abundant salt in water from dunghills, stagnant ponds, and bogs, and wherever there is decaying animal matter; so that the bees drinking at such places must be a happy thought for honey-eaters. But one practical suggestion arises from this examination, namely, supply your bees with salt-and-water, and they will probably not frequent dunghills. In places near the sea bees can procure common salt and the salts of sea-water for themselves; and it will be remembered that the most celebrated honeys in the world, such as those of Mount Hymettus, Mount Ida, Mahon, Cuba, the Bermudas, etc., are all fluid, and even syrupy, and that all these places are within easy access of the sea.

I asked my friend Mr. Rodwell to examine two specimens of honey, both inland, one from Switzerland and the other from Hertfordshire. He found in the Swiss honey iron, alumina, and phosphates, together with lime, magnesia, and potash; and in the Hertfordshire honey all the above ingredients, together with ammonia. As far as the results of the examination of these and the other specimens are concerned, it would seem that bees are extensive collectors, picking up all sorts of stray materials for the purpose of making up their tale of honey. Whether there is any dishonesty in this on the part of the workers, whether these various salts serve some purpose not yet determined, or whether they get accidentally into various kinds of dirty water which the bees drink, we cannot say. At any rate, the fact is very curious that such a variety of salts should be found in honey. It is most probable that honey from other localities would show a similar varied constitution of the ash.

Honey has been regarded by chemists as a solution, more or less concentrated and aromatized, of a concrete in a liquid sugar; but that the climate, the season, the temperature, the kinds of plants on which the bees pasture, give rise to great differences noticed in the honey of different localities. Some kinds contain only a small proportion of the concrete sugar; others so much as to be nearly solid. The colour and aroma are said to depend on the plants, but in wet years or in moist climates in marshy places, the honey is more liquid, and remains so for a longer time.

Honey is nearly always acid, and the presence of acids tends to keep it fluid, of alkalies to turn it brown. The honey from marshy districts is said to be brown, and the taste not pleasant.

The liquid sugar of honey is said to consist of $C_{12}H_9O_9+3HO$, and the solid portion or glucose of $C_{12}H_9O_9+5HO$; so that the change from the liquid to the concrete form arises from the combination of two atoms of water. In such cases the $2HO$ must be taken from another portion of the same honey,—that is, the elements are simply re-arranged; for if the change were, as stated in some books on chemistry, due to time and the appropriation of two atoms of water from the air, we should have $C_{12}H_{12}O_{12}=72+12+96=180$lb. of fluid honey, becoming $C_{12}H_{14}O_{14}$, or $72+14+112=198$lb. of solid honey,—an increase of 10 per cent. in weight, which cannot take place when liquid honey in sealed bottles becomes candied. My experiments tend to show that the absorption of water by exposure renders the honey more liquid, not more solid. The change in the honey may be a molecular one, resembling in some respect that which takes place in barley-sugar when kept some time either in the light or in the dark.

The proportions of the two sugars in honey vary so much as probably to account for most of the differences observable in different specimens. It is said the concrete glucose is more abundant in spring than in autumn if the year be dry than if wet, and in countries abounding in labiated and aromatic plants than in others. The liquid portion is more soluble in concentrated alcohol than the solid, and in this way the two can be separated.

Any experiments on this subject must be with virgin honey, or that drained from the new comb. This, in the Dorsetshire specimen, was colourless and limpid, but when prepared from new and old combs by the action of heat the honey becomes changed, and candies sooner, although a jar of Dorsetshire honey thus prepared at the end of July, 1864, was sufficiently fluid to be poured from the jar in the following March.

But the question still remains unanswered, "Why do bees work in the dark?" In reply to this question from the bees' point of view, it must be remembered that the bees know nothing of the physical property of transparency; they argue that the path by which light enters will also admit their enemies. The poor fly that knocks his head against the pane of glass will never understand why he cannot get through it; and the bee, with all his sagacity, will not appreciate his security under a transparent hive. But it is not true that honey does not solidify in the hive. The volume of the "Naturalists' Library" from which we have already quoted, states (p. 119) that the heat and vapour of the hive are injurious to the honey, and that "in very severe seasons it is sometimes candied."—*Chemical News.*

King's College, London, February 17.

ON RADIATION AND ABSORPTION, WITH REFERENCE TO THE COLOUR OF BODIES AND THEIR STATE OF AGGREGATION.

BY JOHN TYNDALL, ESQ., LL.D., F.R.S.

Delivered at the Royal Institution, Friday, January 19, 1866.

The speaker referred to the relation subsisting between the sensible phenomena of nature, and those processes lying beyond the range of the senses, on which the phenomena immediately depend. He spoke of the function of the imagination in picturing operations which, though great in their aggregate results beyond all conception, are too minute individually to be capable of observation. He referred to the luminiferous ether that fills space, as the most striking illustration hitherto known of the production of a line of thought from the domain of the senses into that of the imagination, and affirmed the existence of this wonderful medium to be based upon proofs at least as strong as those which sustain the theory of gravitation.

Dwelling briefly on the relation of this ether to the atoms and molecules which are plunged in it, he illustrated, by reference to the phenomena of sound, the difference between good and bad radiators. A naked tuning-fork vibrating in free air imparted so small an amount of motion to the air that it ceased to be heard as sound at an inconsiderable distance; the same tuning-fork brought into union with its resonant case produced a sound which could be heard by thousands at ounce. The naked fork was a bad radiator, the combined fork and case was a powerful radiator. This combination of the fork and its case, as regards sound, roughly represented the influence of chemical combination as regards radiant heat. By the act of combination the power of the combining atoms as radiators might be augmented ten-thousandfold. As an example of this the vapour of water was selected; and it was affirmed that a pound of this vapour taken to the top of a high mountain, there heated and exposed before the cloudless heaven, would radiate nine or ten thousand times—possibly twenty thousand times—as much heat into stellar space as could be radiated by either of the constituents of the vapour when uncombined.

The speaker also referred to the well-known analogy between the pitch of a sound and the colour of light, and throwing a large spectrum upon a white screen mentioned the relation between the various colours to the rapidity of ethereal vibration. The space from the red to the blue embraced an infinite number of rates of vibration, gradually and continuously shortening without any interruption. It might be typified by an infinite number of tuning-forks of gradually augmenting pitch, and all sounding at the same time. This spectrum was derived from the carbon points of the electric light; but it was shown that in the case of various other incandescent substances the spectrum was not of this continuous character. The magnificent stream of green light produced by the volatilization of silver in the electric lamp was shown upon a screen, and afterwards the light was analyzed and found to produce two bands of brilliant green, differing but slightly from each other in refrangibility. Here the case is typified, not by an infinite number of tuning-forks, but by two tuning-forks of slightly different pitch. And just as the rate of vibration in the case of the tuning-fork is a fixed rate, so the rate of vibration of the atoms of silver vapour were fixed. And as the colour of the vapour depended on its rate of atomic vibration, the constancy of this rate secured the constancy of colour in the vapour. We cannot make the vapour of silver *white hot*, however we may exalt its temperature. We may augment the brilliancy of the particular rays that it emits, but we cannot cause it to emit that variety of rays the blending of which together produces the impression of white.

Like the vapour of silver the vapour of water has also its definite periods of vibration; and they are not such as to enable the vapour, however high its temperature may be raised, to emit a white light. It can hardly be said to emit any light at all. The flame of hydrogen, for example, is composed of intensely heated aqueous vapour, but it is hardly visible; and it is easy to give the vapour of water a temperature sufficient to raise a solid body placed in the vapour to a bright red heat, while the vapour itself remains absolutely dark. Now the powers of radiation and absorption go hand in hand, and the body which cannot emit luminous rays is incompetent to absorb them. Thus the sun's luminous rays pass freely through the aqueous vapour of our atmosphere; while it is the impediment offered by this same vapour to the radiation from the earth which check the sudden drain of terrestrial heat, and thus renders our planet inhabitable.

This power of electric absorption was illustrated by the action of two tuning-forks which sounded the same note. Both forks being mounted on their resonant stands, one of them was first sounded. The silent fork was then brought near the sounding one, and held near it for five seconds. The vibrations of the excited fork were then quenched, but the sound did not cease to be heard. In fact the silent fork had taken up the vibrations of its neighbour, and continued to sound after the latter had ceased to vibrate. Again, one fork being permitted to remain upon its stand, the other was dismounted and thrown into strong vibration. Detached from its stand, its sound was too feeble to be heard by the audience; but on bringing it near the mounted fork a mellow sound rose which filled the room. Thus the vibrations of the one fork were transmitted through the air and imparted to the other. To effect this transference it was necessary that the forks should be in perfect unison: the fixing upon either of them of a bit of wax not larger than a pea was sufficient to destroy the power of the forks to influence each other.

Thus one sounding body absorbs the vibration of another sounding body with which it is in unison; and here we have in acoustics the representative of that great principle which in optics lies at the base of spectrum analysis, namely, that bodies absorb those rays which they can themselves emit. Thus green vapour of silver, if interposed in the path of a beam of white light, will absorb the green which it can itself emit. Thus also the incandescent vapour of sodium, itself intensely yellow, cuts clearly out the yellow band of the spectrum. And the same is true of aqueous vapour. Its periods of vibration synchronize with those of the rays, or more accurately *waves*, emitted by the warmed earth, and hence its power to intercept those waves by taking up their motion. But it is in dissonance with the luminous waves emitted by the sun, and hence those waves pass through large quantities of it with scarcely sensible absorption.

This incompetence of aqueous vapours to absorb luminous rays is shared by all really transparent bodies; in fact, they are transparent in virtue of their incapacity to absorb luminous rays. Now, transparent bodies in a state of powder are always white, and in white bodies luminous rays have no power. The *light* of the sun, for example, cannot warm white sugar, nor can it warm table salt, nor flour, nor a white dress; it cannot even melt snow. The most powerful luminous beam may be concentrated upon a surface covered with hoar frost without melting a single spicula of the frost crystals. How, then, it may be asked, does sunshine clear away the snow from the mountain heads? Two or three days' sunshine on the mountains suffices to obliterate the traces of a heavy snow-fall: how can this occur if sunshine has no power to melt the snow crystals? It is not the luminous rays of the sun which perform this work, but a body of rays which, though possessing high calorific power, have no light in them. By a process of transmutation these dark rays may be converted into luminous ones, but as they come from the sun, and fall upon the mountain summits, they are utterly incompetent to excite vision. Every stream which channels the glaciers or tumbles down the valleys of the Alps is the direct product of this invisible radiation. To it also the glaciers owe their birth as well as their dissolution. For while the luminous rays of the sun falling on the tropical ocean penetrate the water to great depths without considerable absorption, the dark rays are in great part absorbed close to the surface of the ocean; they therefore heat the water at the surface, and are thus almost the sole excitants of evaporation. Not only, then, do those invisible solar rays, by the fusion of the ice, give birth to the rivers of Switzerland, but it is they that lift the material of these rivers from the sea and store it on the frozen summits of the mountains.

Gathering up the rays emitted by a powerful electric lamp, and concentrating them upon a small focus, water, alcohol, or ether placed at the focus speedily boils, some of them, indeed, almost instantly. But they are not boiled by the luminous rays, though these produce an impression too dazzling to be borne upon the eye. Interposing in the path of the concentrated beam a glass cell containing pure distilled water, the light of the beam is not sensibly diminished, but it is no longer competent to boil or even heat water at the focus. Placing a piece of ice at the luminous focus it is not melted, though, if blackened wood be placed there, it is set on fire. The moment, however, the cell of water is withdrawn the ice melts—melts because the dark rays previously absorbed by the water of the cell are now absorbed by it. There are liquids of very low boiling points—bisulphide of carbon, for instance—which, when placed at the focus where the whole radiation, dark and bright, of the electric lamp is converged, cannot be caused to boil, can hardly be warmed. Water, for instance, requires a temperature of 212° Fahr. to boil it, bisulphide of carbon requires only 118°·4; still the former is boiled in a time insufficient to warm the latter. This arises from the fact, that while water powerfully absorbs the dark calorific rays and allows the luminous ones free transmission, the bisulphide of carbon is transparent to both classes of rays, and hence is warmed by neither of them. Thus, also, when it was stated that sugar could not be warmed by the *light* of the sun, the invisible solar rays were meant to be excluded, for when the *total* radiation of the sun is converged upon white sugar it is immediately burnt up, the agent of its combustion being, however, the dark radiation.

It is possible to filter the composite radiation from the sun or from the electric light, so as to detach almost completely the visible from the invisible rays. It has been already stated that bisulphide of carbon is transparent to both classes of rays; now iodine, a substance which dissolves freely in the bisulphide, is eminently transparent to the invisible rays alone. Hence, a combination of these two substances furnishes us with a *ray-filter*, which, while it pitilessly cuts off the bright rays, allows the dark ones free transmission. At the dark focus we can boil water or alcohol, but we cannot warm bisulphide or bichloride of carbon. Bromine also, notwithstanding its volatility, bears exposure at the focus without being heated. Sulphur also bears the temperature of the focus for a considerable time without ignition. Common phosphorus, a combustible so quick that the warmth of the fingers when in *contact* with it suffices to provoke combustion, bears for twenty or thirty seconds without ignition the action of *radiant heat* at a focus where, in the fraction of a second, platinized platinum is raised to a white heat. The phosphorus is in a great degree transparent to radiant heat. The red iodide of mercury strewn on paper and exposed at the focus has its colour discharged where the invisible images of the carbon points fall upon it, but owing to the transparency of the iodide to radiant heat, it requires some exposure to produce the thermograph. This red substance is far less absorbent of radiant heat than white paper, and hence it is sometimes easier to obtain a thermograph of the carbon points by exposing to the radiation from the lamp the *back* of the paper on which the iodide is strewn, than by exposing the face covered with the iodide. It is often, indeed, more easy to *burn* a thermograph through the paper than to discharge the colour of the iodide. Hence, white paper may be protected from radiant heat by being covered with a substance like the iodide of mercury.

We are here naturally reminded of the experiments of Franklin, which consisted in placing cloths of various colours upon snow, and observing the depth to which they sank in the snow when exposed to direct sunshine. Franklin concluded that the lighter the colour of the body the less is its power of absorption. The generalizations founded on this experiment are, for the most part, fallacious. Results long ago obtained, establishing the vast influence of chemical constitution on radiant heat, led the speaker to contrast iodine, an element, with alum, a body of highly complex character. Both substances were in powder, the one being dark, the other white. Exposed to the radiation from various sources, the white powder proved itself in all cases the most powerful absorber. The dark powder of amorphous phosphorus was also compared with the hydrated oxide of zinc, but the white powder was the best absorber. Bodies of the same colour compared together showed similar differences. The red oxide of lead, for example, was contrasted with the red iodide of mercury, and the oxide proved the most powerful absorber. So also the white chloride of silver was compared with the white carbonate of lead, the lead salt proved by far the most powerful absorber. In this way it was proved that as regards the absorption of radiant heat, white in some cases exceeds black, black in some cases exceeds white, and the other colours are equally capricious; all evidently depending on the chemical constitution of the substances. Here, as in other cases moreover, radiation and absorption go hand in hand, the substance which absorbs heat most powerfully radiating the same heat most copiously.

In the case of Franklin's white cloth exposed on snow to sunshine, there is no reason why it should sink at all; there is, on the contrary, reason to conclude that it must rise relatively to the snow surrounding it. For, as regards the luminous rays of the sun, they are alike powerless to warm the cloth or to melt the snow. Whatever effect is produced is therefore due to the dark solar rays. Now, snow absorbs these rays with greater greediness than any other substance; hence the white cloth, which absorbs less than the snow, really defends the snow underneath it from the action of the sun, and owing to this protection the cloth, if exposed for a sufficient time, will rise in relation to the surface round, just like a glacier table.

But though the cloth is not so good an absorber as the snow, it is nevertheless a very powerful absorber; it comes near the snow in this respect. And when, as in the case of the black cloth, we have added to the absorption of a large portion of the dark rays by the cloth, the absorption of the whole of the luminous rays by the dye, the sum of the absorption of both classes of rays exceeds the absorption by the snow of the dark rays alone. The black cloth will, therefore, sink in the snow. This is the explanation of Franklin's experiment.

The lecturer concluded by referring to various experiments on the transmission of radiant heat through rock salt; to the influence of science as a means of intellectual culture; and to the necessary defects of any system of education in which the study of nature is neglected or ignored.

THE ATTENDANCE OF CHEMISTS IN CASES OF SUDDEN ILLNESS.

The following letter, signed "E. F. P.," appeared in the 'Times' of May 2nd:—

"Sir,—As an eye-witness of a very sad occurrence, viz. the awfully sudden death of Lady Knight Bruce, I trust you will permit me, through the medium of your widely-read columns, to offer a few remarks with regard to the etiquette—law I hope it is not—which forbids any chemist to leave his shop, even to render assistance in the most urgent cases where a doctor's services cannot be obtained at a moment's notice.

"In the case to which I have above alluded, no professional aid could be procured until too late to be available, although four medical men were summoned as early as possible.

"Two chemists in Oxford Street refused to do more than send for a doctor, notwithstanding they were informed of the pressing need of instant succour.

"Those around the unfortunate lady did all in their power in the hope of restoring her to consciousness, but unprofessional efforts must be uncertain and often misguided.

"Under such truly distressing circumstances it does seem strange that chemists are not permitted to attend personally."

The above case is well put by our contemporary 'Punch,' as follows:—

"NON-INTERVENTION IN EMERGENCIES.

"A correspondent of the 'Times' animadverts upon the etiquette—law he hopes it is not—'which forbids any chemist to leave his shop, even to render assistance in the most urgent cases where a doctor's services cannot be obtained at a moment's notice.' Referring to a sudden seizure of illness which terminated in the death of a lady, he says—

"'In the case to which I have alluded, no professional aid could be procured until too late to be available, although four medical men were summoned as early as possible. Two chemists in Oxford Street refused to do more than send for a doctor, notwithstanding they were informed of the pressing need of instant succour. Those around the unfortunate lady did all in their power in the hope of restoring her to consciousness, but unprofessional efforts must be uncertain and often misguided.'

"It is the profession and business of a chemist and druggist to make and sell medicines, not to practise physic. He must needs know how to prepare sal-volatile, and he may have lancets to vend, but he may not know the difference between coma and syncope, and whether a person in a fit requires bleeding or a stimulant. He would render assistance at the peril of the patient, and also at his own. He has before his eyes the possibility of making a fatal mistake, and the horrible fear of a trial in a felon's dock, resulting, at the least, in ruinous law expenses consequent on a verdict of manslaughter returned against him by a British jury, under the direction of a British coroner. 'Enforce responsibility,'—that is a British maxim. Its necessary correlative, unfortunately, is 'Run no risk.'"

ACCIDENTAL POISONING BY LAUDANUM.

Mr. Taylor, coroner, resumed an inquiry on Tuesday, April 10th, at the Coopers' Arms Inn, Wakefield, relative to the death of Mr. Joseph Newsom, innkeeper, who had been poisoned under the following circumstances. Mr. Newsom for some weeks past had been suffering from a bad cold, which caused him very restless and sleepless nights. On Saturday night he was talking to the company at his bar about the trouble his illness gave him, and a young man named Rigg went away, saying that he would get him something that would do him good. He shortly afterwards returned with a bottle containing about six ounces of a light-coloured watery fluid, and told Newsom to take half that night and half the next morning. Newsom followed the instructions given, became very drowsy, wandered very much during the night, and was so dangerously ill next morning that Mr. Kemp, surgeon, was sent for. The doctor, however, arrived too late to be of any service, as the deceased shortly afterwards died, from the effects of a narcotic poison. A chemist and druggist named Denniston stated that Rigg came into his shop on Saturday, and asked for five or eight grains of quinine and six or eight drachms of opium. Witness told Rigg that half a drachm was a full dose under ordinary circumstances, but in such cases as *delirium tremens* a medical man might administer more. Rigg said the person for whom he wanted the medicine was labouring under some such complaint, and the witness added 2½ drachms of laudanum to the quinine, and filled the bottle up with water. At Rigg's request he put a label on the bottle, giving directions for three tablespoonfuls, or about a quarter of the contents, to be taken every three hours. When Rigg returned to the publichouse the bottle had no label upon it, and instead of following the directions of the druggist, and giving Newsom a fourth of the bottle's contents, he told him to drink off half. As regarded the statement of Rigg that the person for whom he intended the potion was suffering from *delirium tremens*, it was proved that Mr. Newsom had not suffered from that complaint. The jury returned a verdict of *Manslaughter* against Rigg, but the coroner admitted him to bail.

A BILL TO PREVENT ANY PERSON WHO HAS NOT OBTAINED THE DIPLOMA OF THE ROYAL COLLEGE OF VETERINARY SURGEONS FROM ASSUMING THE TITLE OF VETERINARY SURGEON.

Whereas her present Majesty, by royal charter bearing date the eighth day of March, in the seventh year of her reign, did for herself, her heirs and successors, grant unto the persons therein named, together with such others as then held certificates of qualification to practise as veterinary surgeons, granted by the Royal Veterinary College of London or by the Veterinary College of Edinburgh respectively, and such other persons as respectively then were and might thereafter become students of the Royal Veterinary College of London, or of the Veterinary College of Edinburgh, or of such other veterinary college, corporate or unincorporate, as then was or thereafter should be established for the purposes of education in veterinary surgery, whether in London or elsewhere in the United Kingdom, and which her Majesty and her successors should under her or their sign manual authorize in that behalf, and should pass such examination as might be required by the orders, rules, and byelaws which should be framed and confirmed pursuant to the said charter, should by virtue thereof be members of and form one body politic and corporate by the name of "The Royal College of Veterinary Surgeons," by which name they should have perpetual succession and a common seal, with power to sue and be sued, and to hold personal estate; and her Majesty did further declare and grant that the veterinary art, as practised by the members of the said body politic and corporate, should be thenceforth deemed and taken to be and recognized as a profession, and that the members of the said body politic and corporate, solely and exclusively of all other persons whomsoever, should be deemed and taken and recognized to be members of the said profession or professors of the said art, and should be individually known and distinguished by the name or title of Veterinary Surgeons; and in the said charter were contained certain regulations for the conduct and management of the affairs of the said corporation:

And whereas to encourage the progress of the veterinary art it is expedient that such of her Majesty's subjects as may from time to time require veterinary medical aid should be enabled to distinguish the members of the Royal College of Veterinary Surgeons from others who have not passed the examination requisite for entitling them to become members of the said College, and who are not members thereof:

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 for all purposes be cited as "The Veterinary Medical Act, 1866."

2. This shall take effect from the *first day of October*, *One thousand eight hundred and sixty-six.*

3. Any person, not being a member of the said Royal College of Veterinary Surgeons, who shall after the time appointed for this Act coming into operation take or use the name or title of Veterinary Surgeon, or who shall falsely represent himself to be a member of the said College, or who shall use any other name or title with intent to lead, or whereby the public may be led to believe that he is a member of the said Royal College of Veterinary Surgeons, shall, upon a summary conviction for any and every such offence, pay a sum not exceeding *five pounds* nor less than two pounds.

4. Provided nevertheless, that this Act shall not affect any person who shall have assumed the name or title of Veterinary Surgeon prior to *six months* previous to the passing of this Act.

5. Penalties under this Act may be recovered before two justices in manner directed by an Act passed in the Session holden in the eleventh and twelfth years of the reign of her Majesty Queen Victoria, chapter forty-three, intituled "An Act to facilitate the Performance of the Duties of Justices of the Peace out of Sessions within England and Wales with respect to summary Convictions and Orders," or any Act amending the same; and in Scotland by summary complaint before the sheriff, sheriff substitute, or two justices, or in burghs before the magistrates, in manner provided by "The Summary Procedure Act, 1864."

Mr. Holland moved the second reading of this Bill. The object of this Bill was to prevent unqualified persons from holding out to the public that they were members of the Royal College of Veterinary Surgeons when, in point of fact, they were not. There were at present 1244 persons practising as veterinary surgeons under the assumption that they had obtained diplomas. There were 1189 farriers who were acting as such who had no diplomas. Altogether there were 2433 persons practising without any diploma against 1144 regularly qualified practitioners. It was essential that an improved status should be given to veterinary surgeons, and he felt that a simple Bill requiring that every veterinary surgeon should be, *bonâ fide*, a member of the Royal College of Veterinary Surgeons would be of great value at the present time. He proposed that any person who fraudulently held out to the public that he was a veterinary surgeon should be liable, on summary conviction, to a penalty of not exceeding £5, and not less than £2. The Bill, however, was not to affect persons who should have assumed the title six months previous to the passing of the Bill.

Sir J. Jervoise was at a loss to understand why a man should be prevented from assuming the title of veterinary surgeon. He suggested that when in Committee some alteration should be made in its provisions, to make them apply to those who held themselves out as members of the Royal College of Veterinary Surgeons.

Mr. Newdegate said he believed this Bill would be acceptable as a means of promoting the education of the profession. He had been many years one of the governors of the Royal College of Veterinary Surgeons, and he could assure the House that great exertions had been made by the College to raise the scale of education for veterinary surgeons, and no obstacle had interposed to render their attempts ineffectual to a certain degree more than that the education after it was completed brought with it no distinction, because the uneducated as well as the educated appeared before the public with equal claims, so far as appearances were concerned. During the recent visitation of the cattle plague the veterinary surgeons had been placed in a difficult position. They had had to treat a disease which was novel in this country,—at least it had not appeared in this country for 100 years. The College was perfectly informed of the nature of the disease from the researches and investigations of Professors Simonds and Spooner, and they had done everything in their power to prepare the profession for the dangers they had to encounter, and also to warn the public. But the profession was in this position, that they were bound not to discourage any attempt to find a remedy. At the same time he was bound to say, that those attempts had not been successful, and although, from the nature of the disease, mistakes had invariably arisen, yet there could be no doubt that veterinary surgeons had been of great service to the country.

Mr. Bruce said it was not his intention to oppose this stage of the bill, but it would be necessary to make some amendments in it in Committee. He agreed it was going too far to say that any man who used the name of veterinary surgeon should subject himself to a penalty. If, however, he assumed that he was a member of a college when he was not, that might render such a person liable to penalties. In the case of the chemists and druggists and the Pharmaceutical Chemists, it was made an offence to assume the name of Pharmaceutical Chemist, and if with regard to veterinary surgeons they added something to the title, such as Royal College, etc., it might form a reasonable proposition that for the infringement of the title the person so offending should be liable to a penalty. He thought the veterinary surgeons were not a sufficiently large body of men to be entrusted with the monopoly of issuing diplomas. He believed a great many diplomas had been given to men whose knowledge of their profession did not entitle them to that distinction.

The Bill was then read a second time.

This Bill was appointed for Committee on May 30th.

MISCELLANEA.

Accidental Poisoning by Laudanum.—An inquest has lately been held at Lee Moor, a few miles from Wakefield, respecting the death of a widow woman named Learoyd. It appeared that a little girl, aged nine years, was sent to the adjoining village of Lofthouse, to fetch some tincture of rhubarb from the shop of a general dealer, named Thompson. The shop was in the charge of a woman, Frances Snowden, who was unable to read very well, and the little girl pointed to a bottle labelled "Tinct. Opii," as containing tincture of rhubarb. Unfortunately the woman took it for granted that the child was right, and proceeded to measure out an ounce of laudanum; half of which was given to the poor woman, who, in spite of medical aid, died the next morning. The jury returned a verdict of "Manslaughter against Frances Snowden," who was committed for trial. Bail, however, was accepted for her appearance.

Poisoning by Methylated Spirit.—Dr. Lankester has lately held an inquest in St. Giles's on the body of a man who had habitually, for the last two years, intoxicated himself with methylated spirit. This he used to purchase at a chemist's shop at the rate of three quarterns for three-halfpence. He was also in the habit of eating opium, and had been seen to bite off a large piece of the drug and eat it like an apple. One morning the deceased arose from his bed in a maddened condition, and, on the promise of getting him methylated spirit, was induced to walk in the direction of St. Giles's Workhouse. On his way he dropped down dead. The medical evidence showed that the deceased died from pulmonary apoplexy and effusion of serum on the brain, caused by excessive drinking of methylated spirit. The coroner remarked that the Government allowed this spirit to be imported free of duty, believing no one could drink it, but here the revenue had certainly been cheated. A verdict in accordance with the medical evidence was returned.

BOOKS RECEIVED.

ASIATIC CHOLERA. By F. A. BURRALL, M.D. New York: William Wood and Co., 61, Walker Street. 8vo, pp. 155. 1866. (From the Publishers.)

ON THE SAFE ABOLITION OF PAIN IN LABOUR AND SURGICAL OPERATIONS, BY ANÆSTHESIA WITH MIXED VAPOURS. By ROBERT ELLIS. London: Robert Hardwicke, 192, Piccadilly. 1866.

ON THE USE OF THE SPHYGMOGRAPH IN THE INVESTIGATION OF DISEASE. By BALTHAZAR W. FOSTER, M.D., etc. London: printed by T. Richards, 37, Great Queen Street. (From the Author.)

TO CORRESPONDENTS.

Persons having seceded from this Society may be restored to their former status on payment of arrears of subscription and the registration fee of 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.

An Improver.—(1) The retail trade would be preferable. (2) 'Ure's Dictionary of Arts, Manufactures,' etc.

B. P.—Volumetric Test Solutions.—The use of iodine as a volumetric test solution is founded upon the formation of hydriodic acid (HI). An atom of iodine takes the required hydrogen from an atom of sulphuretted hydrogen. A similar result is also obtained when the solution of iodine is added to solution of sulphurous acid, in which case SO_2 is converted into SO_3 by decomposing water, the hydrogen of which is taken by the iodine, and the oxygen by the sulphurous acid, and, as this acid requires only one atom of oxygen to convert it into SO_3, the change is represented by one atom of iodine. In using the solution of iodine for the estimation of arsenious acid, the reaction is similar, but here the arsenious acid (AsO_3) is converted into arsenic acid (AsO_5), for which two atoms of oxygen are required, involving the use of two atoms of iodine; therefore, the iodine that corresponds to the conversion of an atom of sulphurous into sulphuric acid will effect the conversion of only half an atom of arsenious into arsenic acid.

In the use of nitrate of silver for estimating hydrocyanic acid, as described in the Pharmacopœia, the acid is first neutralized with soda, and, on adding nitrate of silver to this, a soluble double salt is formed consisting of cyanide of sodium and cyanide of silver, in which one atom of silver represents two atoms of cyanogen or hydrocyanic acid.

The other cases alluded to are similarly explained.

Vindex.—Peroxide of potassium is best prepared by submitting fused potassium to the action of a regulated current of dry air, and afterwards of oxygen gas at a moderate temperature.

Inquirer (Torquay).—Apply by letter to Professor Bentley, 17, Bloomsbury Square, giving name and address.

Apprentice (Lincoln).—Bentley's 'Manual of Botany,' price 12*s.* 6*d.*

W. J. H. (Manchester) wishes for the formula for "Halley's Acid Solution."

G. R. L. S. (Langborne).—(1) The work itself. (2) Uncertain—probably during the present year. (3) Yes.

"*Medicus*" (Bristol).—*Syrupus Ferri Superphosph. c. Calce.* Vol. i. (2nd series) p. 498.

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, Bloomsbury Square.

INDEX.

END OF VOL. VII.

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